PLAN FOR COMPILATION OF THE ALASKA FOREST SURVEY BY THE IBM METHOD

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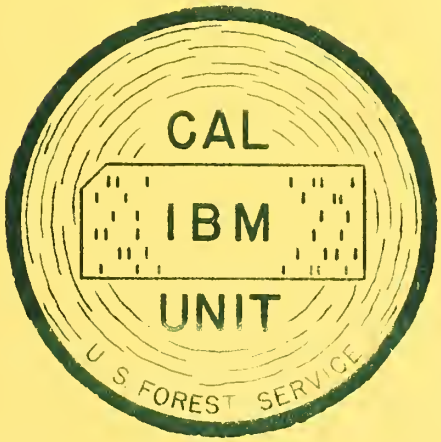

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1. INTRODUCTION

The Forest Survey for the Territory of Alaska is under the direction of the Alaska Forest Research Center. Alaska has been divided into three subregions for Forest survey, as follows: The Southeast Alaska subregion including all of the Tongass National Forest area and all other areas south of Yakutat Bay; the Chugach Subregion including the glacial and other areas draining towards the Gulf of Alaska, from Yakutat Bay north to the Chugach National Forest, and the Chugach National Forest including Afognak Island; and the Interior Subregion which includes all of the remaining area of the Territory. Nearly all of the commercial forest land in the Chugach and South east Alaska subregions is in National Forest ownership. Because of this, the inventory for these two subregions is a cooperative project between the Alaska Forest Research Center and the Alaska National Forest Administrative Region 10. Field work for the initial inventory was started in 1954 in the Juneau survey unit of the Southeast Alaska subregion. This work was completed for the Juneau and Petersburg units by the end of the 1956 season. The inventory is scheduled for the Ketchikan, Sitka, and Yakutat units in 1957, thus completing the entire Southeast Alaska Subregion. The inventory work is scheduled for the Interior subregion in 1958, to be followed by the Chugach. Subregion in 1959. After the initial Forest Survey is completed for Alaska, it is planned to make a maintenance resurvey of each subregion every 10 years.

The objectives of the National Forest Survey are given in the Forest Survey Manual. The policy of the ARC is to obtain all of the data required for the National objectives and to publish reports of the forest resources of the Territory by Subregion. In addition the National Forest Administration of the Alaska Region furnished money to obtain greater intensification in the collection and compilation of the forest land area, timber volume, and timber growth and mortality data that are basic to the Forest Survey and timber management planning objectives.

The intensification of the regular Forest Survey will provide type maps, and volume, growth, and mortality statistics by the Survey Units within each Subregion. These Survey Units correspond very closely with the NFA Timber Management working Circles, and NFA plans to prepare separate statistical reports for them.

The methods of inventory and compilation used for the Chugach and Southeast Alaska Subregions will be the same. However, the methods to be used for the Interior Subregion still are being developed; and it is probable that the methods adopted for the Interior will be different from those of the other two Subregions. Therefore, the procedures of compilation outlined in this Plan will apply to the Chugach and Southeast Alaska Subregions and not to the Interior Subregion. Nevertheless, IBM Codes for certain items for the Interior Subregion are included in this Plan. This was done so that the coding system could be set up in as complete a form as possible at this time.

1.1 Purpose of Plan. The Alaska Forest Research Center originally planned to have their field men compile the Forest Survey data during the winter season using conventional hand methods; and this was done for the data of the Juneau Survey Unit[1/]. Their subsequent experience in preparing the type maps has shown that this is a full-time winter season job, leaving no time available for data compilation. The alternative of hiring a clerical staff to compile the data by hand was rejected because of the difficulties experienced in filling this type of position. Therefore the ARC considered compiling their Forest Survey data by the punched card method and because of the accuracy, the economy, and the flexibility of the method, they decided to use it. Therefore, the ARC requested the IBM Service Unit of the CAL Station to prepare a plan for compiling their Forest Survey data by the IBM method.

This Plan is prepared in response to the request of the Alaska Forest Research Center. The objective of the Plan is to describe in detail the methods proposed for compilation of the AL Forest Survey data of the Chugach and SE Alaska Subregions by the IBM Service Unit.

The procedures for compiling area, volume, quality, and growth data are included in the Plan. In addition, the data forms and the summary tabulations are illustrated, the IBM card decks are described, and a complete list of IBM codes is provided.

1.2 Field Manual. The manual of FOREST SURVEY FIELD INSTRUCTIONS FOR SOUTH EAST ALASKA was prepared to guide Forest Survey personnel in the gathering of basic data on the forest resource of Southeastern Alaska[2/].

1/ Data for the Juneau Survey Unit will be transferred to IBM cards.

2/ Includes the Chugach and SE Alaska Subregions.

It describes the photo interpretation techniques and procedures for the photo interpreters to follow in the preparation of the aerial photos and in the interpretation, classification, and delineation of forest and nonforest areas. Instructions are given for obtaining forest ownership information. It describes in detail the methods and procedures for surveying sample field plots to obtain data on volumes, growth, and mortality. Instructions for the preparation of a forest cover map also are given.

1.3 The IBM Method of Compilation. The procedures of the IBM method of compilation are designed to obtain accurately, efficiently, and economically the area, volume, quality, and growth summary data required for the published reports; and to obtain the other summary data required for administrative and other purposes. The procedures of the IBM method, proposed in the Plan, are summarized in section 1.31.

The IBM method of compilation will provide summary tabulations of area volume, quality, and growth data by any combination of control items that are punched in the IBM cards. Sorting the cards in the proper sequence of control items allows the automatic accumulation and printing of totals at three levels of control (minor, intermediate, and major) within a tabulation, and an overall (final) total for the tabulation; provided that the combined number of digits in these totals do not exceed the counter space of the tabulator. The summary tabulations proposed as a part of the regular IBM Service Unit procedure are described in sections 2.6, 9, 10.3, 11.5, 11.63 and 13.5.

1.31 Summary of Procedures.

1.311 Area. The estimates of area for each Survey unit will be obtained by point sampling on aereal photos and classifying the points into land type/local forest type/stand size class/stocking class strata. The classification for a portion of the photo plots will be ground checked. Area determination is described in section 2.1. The area data to be compiled will be recorded in code on the Record of Area, the Area Field Check Record, and the Table of Area Control Data, as described in sections 2.2, 2.3, and 2.4.

The area sample data at the block level will be transferred into an area sample deck of IBM cards. The area field check data will be transferred into an area check deck of IBM cards. The field check data will be summarized and the results will be applied to the area sample data. The adjusted area sample data will be summarized into an area summary deck of IBM cards and the number of photo plots will be converted into acres in this deck.

The area summary deck of IBM cards will be used to prepare the area tabulations for the report tables. Special area summary tabulations can be prepared also as requested.

The area compilation procedures are described in section 2.5, and the area summary tabulations are described in section 2.6.

1.312 Volume. The data that will be used repeatedly in compiling volume will be placed in IBM master decks. These volume data include; the cubic foot and Scribner Decimal C tree volumes, average merchantability factors, average breakage factors, Scribner to International 1/4" ratios, cubic foot to sawlog cubic foot ratios, and volume blow up factors. The IBM master decks for volume will be used with the IBM detail decks in compiling the volume data. The IBM master decks for volume are described in section 3.

The volume sample data will be obtained as described in the Field Manual and the data to be compiled will be recorded in code on the Plot Record, as described in section 4.

The volume sample data will be transferred into a location control deck of IBM cards that will contain the control data for each plot, and into a tree work deck of IBM cards that will contain the plot control data and the tree control data for each tree on the plot. The cubic foot and Scribner Dec. C gross volumes will be assigned to each tree. The tree work deck will be used to prepare the tree volume deck in which the cubic foot net and the Scribner b.f. woods gross tree volumes will be calculated and punched.

The preparation of the location control and the tree work and volume decks of IBM cards are described in section 5.

The merchantable, sound cull, rotten cull, and solvable dead volumes will be compiled by survey unit; but the mortality volume will be compiled by subregion. The total cubic foot volume will be compiled for all merchantability classes and the board foot volumes will be compiled for the merchantable, solvable dead, and mortality classes.

The tree cubic foot net and Scribner b.f. woods gross volumes will be summarized by merchantability class, LT/SSC stratum, species, and 10" DBH groups. The number of sample plots will be summarized by LT/SSC stratum to obtain the total acres on which the trees of each 10" DBH group were sampled. Volume conversion factors will be calculated and used to convert the species/10" DBH group volumes to average volumes per acre.

The average breakage factors will be applied to the Scribner b.f. woods gross average volume per acre to obtain the net volume. This Scribner b.f. average net volume per acre will be converted to International 1/4" average net volume per acre using ratios.

The species/10" DBH group average net volumes per acre will be summarized by merchantability class and kind of volume to obtain the total average net volume per acre for each LT/SSC stratum, also referred to as the volume stratum. The survey unit volume stratum total average net volumes per acre by merchantability class for cubic foot, and International 1/4" and Scribner board foot volumes will be punched into decks of IBM master cards for use in compiling the survey unit total net volumes.

The compilation of the average net volumes per acre is described in section 6.

The cubic foot, Int. 1/4" b.f., and Scribner b.f. total net volumes will be calculated for each survey unit by block and LT/T/SSC/SC stratum. These stratum total volumes will be punched into area/volume decks of IBM cards. These cards will be used to prepare part of the volume summary tabulations for reports, and for other purposes as required.

The total volume compilation is described in section 7, and the volume summary tabulations are described in section 9.

The volume stratum/merchantability class total net volumes (cubic foot, Int. 1/4" b.f., and Scribner b.f.) will be proportioned to the species and their respective 10" DBH groups. This will be done by summarizing the volume stratum/merchantability class average net volumes per acre by species and 10" DBH group and punching a species and diameter percent calculation deck of IBM cards. The species percent of the stratum volume, and the diameter group percents of the species volume will be calculated and punched into the species and diameter percent decks. These percents will be applied to the volume stratum total net volumes, and the species and diameter group total net volumes will be punched into the species and diameter volume decks of IBM cards. The species and diameter volume decks will be used to prepare part of the volume summary tabulations for the reports, and for other purposes as requested.

The species and diameter group cubic foot merchantable total net volumes for each survey unit will be converted to sawlog cubic and upper stem cubic (and hardwood limbwood) total net volumes by applying the total cubic to sawlog cubic factors. These volumes will be used in the reports.

The species and diameter group total net volume compilation is described in section 8, and the volume summary tabulations are described in section 9.

The merchantable and mortality volume sample data will be compiled also for use in the sample error calculations. The merchantable cubic foot net and Scribner b.f. woods gross volumes, and the mortality cubic foot net volumes will be summarized by field location for each survey unit and punched into a deck of location volume summary cards. The PT volume will be raised to the ST level and the PT + ST volumes will be raised to the 1-acre level. Mortality volumes also will be raised to the 10 year level. The location volumes on a 1-acre level will be squared and summarized for use in the volume sample error calculations.

The volume error data compilation and the summary tabulationa are described in section 10.

1.313 Quality. One IBM master deck will be prepared for use in compiling the quality data. This deck will contain the log percent of the tree gross volume based on the 16 foot log height of the tree and the position of the log in the tree.

The quality sample will be obtained as described in the Field Manual and the data to be compiled will be recorded in code on the Plot Record, as described in section 11.1. The tree quality data will be punched into the tree work deck when the tree control data are punched. The tree work deck will be used to prepare the log volume deck with one card for each quality log in the quality sample trees. The data placed in the log volume deck will include the tree Scribner Dec. C gross volume. The log Scribner Dec. C gross volume will be calculated for each log using the log percent of tree gross volume master deck. The log merchantability factor will be used to calculate the log Scribner Dec. C net volume. This net volume will be raised to the 1-acre level. In addition, the Scribner b.f. net volume will be calculated and raised to the 1-acre level for all quality trees on quality sample plots, using the tree volume deck of IBM cards. The tree volume deck for quality trees and the log volume deck will be used to prepare summary tabulations from which percentages can be calculated for use in obtaining the subregion total quality volume by species and log grade.

The quality volume data also will be compiled for use in the sample error calculations. The Scribner b.f. quality log volume on a 1 acre basis will be summarized by field location. The location quality volumes will be squared and summarized for use in the quality volume sample error calculations.

The quality log compilation, summary tabulations, and quality error data compilation are described in section 11.

1.314 Growth. The growth sample will be obtained as described in the Field Manual and the data to be compiled will be recorded in code on the Plot Record as described in section 12. Growth data are obtained for young growth sawtimber and poletimber stands; but are not obtained for old growth sawtimber, seedling/sapling, and nonstocked stands.

The total net growth for the AL - Forest Survey will be compiled by subregion using the yield table method. However, data are being obtained and punched so that the tree method can be used if required; but these data will not be compiled.

1.314-1 Yield Table Method. The yield table method will be used in compiling the growth data for the Chugach and SE Alaska subregions.

One IBM master deck will be prepared for use with the yield table method. This deck will contain the cubic foot and Int. 1/4" b.f. net mean annual increments per acre by site and stand age.

The Scribner b.f. and Int. 1/4" b.f. net volumes will be calculated and punched into the cards of the tree volume deck for the trees in the growth sample. These cards will be used to summarize the cubid foot, and Int. 1/4" b.f. tree net volumes by individual sample plot. The plot volumes in the summary cards will be raised to the 1 acre level and the net mean annual increment will be assigned to each plot. The plot volume summary deck will be used to prepare the summary tabulations of plot total volume and annual increment per acre from which a growth percent will be calculated. The growth percent will be applied to the subregion total net volume to obtain the total net growth.

The yield table method of growth compilation and the growth summary tabulations are described in section 13.

1.314-2 Tree Method. The tree method of compiling growth data can be used if required. However, this method is not described in detail in the Plan.

One additional IBM master deck will be required for this method. This is the 1/10" DBH Volume Table Master deck that will be used to assign the present and past volumes to the growth sample trees, based on the present and past 1/10" DBH of the tree.

The growth sample data for the tree method will be punched into the tree work deck when the tree control data for volume are punched. The tree growth deck will be prepared from the tree work deck. The 1/10" DBH 10 years ago will be calculated and punched into the tree growth deck, and the past and present cubic foot and Scribner Dec. C gross volumes will be punched. The 10 year gross volume increments will be calculated and converted to cubic foot net and Scribner b.f. woods gross volume increment by applying the merchantability factors. The volume increments will be assigned to growth or ingrowth.

The tree cubic foot net and Scribner b.f. woods gross 10 year net volume increments will be summarized by subregion, LT/SSC stratum, species, and 10" DBH group. The number of growth sample plots will be summarized by LT/SSC stratum to obtain the total acres on which the trees of each 10" DBH group were sampled. Growth conversion factors will be calculated and used to convert the species/10" DBH group volume increments to average volume increments per acre. The average breakage factors will be applied to the Scribner woods gross average volume increment per acre to obtain the net volume increment. The net volume increments are gross growth. The Scribner b.f. average gross growth per acre will be converted to Int. 1/4" using ratios.

The species/10" DBH group average gross growth per acre will be summarized by kind of volume to obtain the total average gross growth per acre for each LT/SSC stratum, also referred to as volume stratum. The subregion volume stratum total average gross growth per acre for cubic foot, Int. 1/4" b.f. and Scribner b.f. kinds of volume will be punched into a deck of IBM master cards for use in compiling the subregion total gross growth.

The cubic foot, Int. 1/4" b.f., and Scribner b.f. total gross growth will be calculated for each subregion by survey unit, block, and LT/T/SSC/SC stratum. This stratum total growth will be punched into an area/growth deck of IBM cards. These cards will be used to prepare part of the growth summary tabulations for reports, and for other purposes as required. The volume stratum total gross growth will be proportioned to the species and their respective 10" DBH groups. This will be done by calculating species and diameter percents for growth using the volume stratum average gross growth per acre. These percents will be applied to the volume stratum total gross growth, and the species and diameter group total gross growth will be punched into IBM cards. The species and diameter growth decks will be used to prepare part of the growth summary tabulations for the reports, and for other purposes as requested.

The species and diameter total net mortality volume will be subtracted from the total gross growth to give the total net growth. The total net growth will be proportioned to main growth and ingrowth using percents derived from summary tabulations of the 10 year volume increment in the tree growth deck.

The tree growth sample data will be compiled for use in the sample error calculations. The tree cubic foot net and Scribner b.f. woods gross 10 year volume increments will be summarized by field location and punched into a deck of location growth summary cards. The location growth will be raised to the 1 acre level and squared. The location growth data will be summarized by subregion for use in the growth sample error calculations.

The compilation of growth by the tree method is outlined in section 14.

1.32 Items of Responsibility. The ARC will be responsible for:

(1) Furnishing the basic Forest Survey data in final coded form ready for transfer to IBM cards.

(2) Advising and guiding the CAL IBM Service Unit in the use of the basic data.

(3) Reviewing the intermediate results of the data compilation and advising the CAL IBM Service Unit on their use.

(4) Consulting with the CAL IBM Service Unit before changing the composition of the basic Forest Survey data.

The CAL IBM Service Unit will be responsible for:

(1) Transferring the basic Forest Survey data to IBM cards.

(2) Compiling the data in accordance with the approved procedures of this Plan.

(3) Requesting advice as needed from the ARC.

(4) Advising the ARC on methods of achieving more efficient compilation.

(5) Cooperating with the ARC in providing for changes in the composition of the basic Forest Survey data.

(6) Informing the ARC on the progress of compilation.

(7) Preparing special summary tabulations of Forest Survey data as requested by the ARC.

1.33 IBM Machine Instructions. The detailed IBM machine instructions and procedures for implementing this Plan must be prepared before compilation of the data can begin. These instructions will tell the IBM equipment operators the exact steps to take in compiling the ARC Forest Survey data. The IBM machine instructions will be prepared after the Plan is approved.

AREA

2. AREA COMPILATION

2.1 Area Determination. The point sampling technique will be used to determine areas for the survey units, for which the gross land areas are known, and which are the control units of area determination. The detailed area data from the point samples will be expanded to the sample unit level.

Areas will be determined by septematically establishing a series of five points, called photo plots, on each effective photo for the survey unit. The photo plots will be numbered consecutively, beginning with 0001 in each survey unit. Each photo plot will be stereoscopically examined and classified by land type, local forest type, stand size class, and stocking class stratum. This information will be recorded on the Photo Interpretation Plot Record, form no. 2, that is illustrated in the Field Manual. The Classification for each photo plot will be determined on the basis of the 10 acre area including and immediately surrounding the plot. The location of the photo plot will indicate the classification for the plot if the 10 acre area is composed of several different LT/T/SSC/SC strata, none of which are 10 acres in size.

When all of the photo plots for a block have been classified, the number of plots will be summarized by stratum and recorded, along with their control data, on the Record of Area as described in section 2.2.

The photo classification will be field checked for each survey unit after classification is completed for all of the plots in the unit. A sample of plots will be selected at random for field checking. The original photo classification and the field classification of the checked plots will be recorded on the Area Field Check Record as described in section 2.3. This area field check data will be used to adjust the photo classification data for all of the plots in a survey unit as described in section 2.54.

The total number of photo plots for each survey unit by block, and the number field checked, will be recorded in the Table of Area Control Data as described in section 2.4. The information in this table will be used to convert the number of photo plots to acres for the survey unit, as described in section 2.57.

The ownership of forest land will be obtained from NFA records at the district level. At the present time, over 99 percent of the forest land is in NFA ownership. All private owners and other owners acquired their holdings as patented claims and withdrawals from what was originally National Forest Land.

Therefore, proportions of forest land area by ownership will be applied to the total forest land area of each survey unit to obtain the estimate of forest land area by ownership. This will be done by the ARC.

2.2 Record of Area, Form 9, 1956. The Record of Area form will be used to receive the entries of the control items and number of photo plots (dots) of each stratum by block for each survey unit. The data entered on the Records of Area will be taken from the Photo Interpretation Plot Record, Form no. 2. All data to be transferred to IBM cards must be recorded in code on the Record of Area. The Record of Area is illustrated in section 15.11, and the instructions for entering the codes are given in section 17.

One or more Records of Area will be used for recording the area data for each survey unit of each subregion. The heading control items of state, subregion, and survey unit must be filled in completely in code on each Record of Area used. A new Record of Area must be used when any one of these heading control items changes.

One line of data in the Record of Area must be completed for each stratum encountered in each block. The control items of block, land type, local forest type, stand size class, and stocking class, and the number of dots (photo plots) must be filled in completely in code for each stratum entry. Unchanged item codes to the left of a changed item code do not need to be recorded each time; but whenever it is necessary to enter a new code for any item, all codes to the right of it must be reentered whether or not they change. The number of dots will be recorded as four-digit numbers for each stratum.

As the Records of Area are completed for each block, the number of photo plots should be summed by land type and recorded in the Table of Area Control Data as described in section 2.4.

The Records of Area should be sent to the IBM Service Unit by survey unit groups, and arranged in order by block. The Records of Area should be accompanied by the Table of Area Control Data and a map showing the survey unit and block boundaries and codes.

The IBM Service Unit will transfer the stratum entries from the Records of Area into IBM cards as described in section 2.51.

2.3 Area Field Check Record, Form 10, 1956. The Area Field Check Record will be used to receive the entries of the control items, photo classified and field classified, for each photo plot that is field checked.

The photo class data entered on the Record will be taken from the Photo Interpretation Plot Record, Form no. 2; and the field class data will be taken from the photos after the classifications have been field checked. All data to be transferred to IBM cards must be recorded in code on the Area Field Check Record. The Record is illustrated in section 15.12, and the instructions for entering the codes are given in section 17.

One or more Area Field Check Records will be used for recording the field check data for each survey unit of each subregion. The heading control items of state, subregion, and survey unit must be filled in completely in code on each Record used. A new Record must be used when any one of these heading control items changes.

One line of data in the Area Field Check Record must be completed for each photo plot checked. The photo class and field class control items of land type, local forest type, stand size class, and stocking class, and the field class item of site must be filled in completely in code for each photo plot. Unchanged photo class or field class item codes to the left of a changed item code do not need to be recorded each time but whenever it is necessary to enter a new code for any item, all codes to the right of it must be reentered whether or not they change.

When the Area Field Check Records are completed for a survey unit, the number of photo plots field checked for each block should be summed by land type and recorded in the Table of Area Control Data as described in section 2.4.

The Area Field Check Records should be sent to the IBM Service Unit by survey unit groups, when the Records of Area are submitted. The IBM Service unit will transfer the photo plot entries from the Area Field Check Records into IBM Cards as described in section 2.52.

2.4 Table of Area Control Data. A Table of Area Control Data will be prepared for each survey unit of each subregion. The basic data that will be recorded in the Tables are the total number of photo plots in the area sample and the total number of photo plots field checked. These data will be recorded by land type within each block of the survey unit.

The sum of the number of photo plots sampled and checked for the survey unit will be entered in the spaces at the bottom of the Table; and the total land area of the unit will be entered also. The area blow up factor will be calculated by dividing the total land area by the total number of photo plots, and recorded as an eight-digit number with five decimals.

The Tables of Area Control Data should be sent to the IBM Service Unit with the Records of Area to which the control data applies. The IBM Service Unit will transfer the blow up factor into an IBM card as described in section 2.56; and the total land area will be used for balancing purposes as the summary tabulations are prepared.

The Table of Area Control Data is illustrated in section 15.13.

2.5 Survey Unit/Block Area Compilation. The procedures described in this section will be followed using all of the data for a survey unit, but the identity of the blocks within each unit will be maintained.

2.51 Punch and Verify Area Sample Deck No. 01.

The Area Sample Deck No. 01, described in section 16.01, will be key punched and verified from the heading and body of the Records of Area, described in sections 2.2 and 15.11. One card will be punched for each stratum entry on the Record of Area. The Control items of state, subregion, survey unit, block, land type, local type, stand size class, and stocking class; and the number of dots will be punched into each card. The control items of major type and volume stratum will be gang punched later, if necessary.

The Area Sample Deck No. 01 will be sorted in order by all control items and listed, as described in section 2.631. This deck will be used to prepare the Area Work Deck No. 07, as described in section 2.54.

2.52 Punch and Verify Area Check Deck No. 06. The Area Check Deck No. 06, described in section 16.05, will be key punched and verified from the heading and body of the Area Field Check Records, described in section 2.3 and 15.12. One card will be punched for each photo plot entry on the Record. The control items of state, subregion, and survey unit; photo class items of land type, local type, stand size class, and stocking class; and the field check items of land type, local type, stand size class, stocking class, and site will be punched into each card.

The Area Check Deck No. 06 will be sorted in order by all field check control items within all photo class control items and listed, as described in section 2.632.

2.53 Area Field Check Data Summary. The Area Check Deck No. 06 will be sorted by field check items (except site) and photo class items; and tabulated to accumulate the number of plots, as described in section 2.633. The total number of plots will be checked with that recorded in the Table of Area Control Data

as being field checked. This summary tabulation, Area Table C, will be used in the preparation of the Area Correction Factor Master Deck No. 52, as described in section 2.532.

2.531 Summary Punch Area Photo Stratum Master Deck No. 51. As the Area Check Deck No. 06 is tabulated, the Area Photo Stratum Master Deck No. 51, described in section 16.52, will be summary punched. One card no. 51 will be punched automatically for each original photo class control group of Deck No. 06. Each card No. 51 will contain the items: state, subregion, and survey unit; the photo class land type, local type, stand size class, and stocking class; and the number of field class control groups for each original photo class control group.

The Area Photo Stratum Master Deck No. 51 will be used as described in section 2.541.

2.532 Punch and Verify Area Correction Factor Master Deck No. 52. The summary tabulation of the Area Check Deck No. 06, Area Table C, prepared in section 2.53 will be used to prepare the Area Correction Factor Master Deck No. 52. The percent that the number of photo plots of each field class stratum is of the total number of photo plots of each original photo class stratum will be hand calculated and recorded as a five-digit number with two decimals on Area Table C. The field class strata percents must equal 100.00 for each original photo class stratum. A field class stratum number will be assigned and recorded as two-digits for each field class stratum of each original photo class stratum. The field class stratum numbers will begin with 01 for each original photo class stratum. The total number of field class strata will be recorded as two-digits for each original photo class stratum.

The Area Correction Factor Master Deck No. 52 described in section 16.53, will be key punched and verified from Area Table C, illustrated in section 2.633. One card will be punched for each field class stratum of each original photo class stratum. Each card No. 52 will contain the control items: state, subregion, and survey unit; the photo class items of land type, local type, stand size class, and stocking class; the original total number of photo class plots; the field class items of land type, local type, stand size class, and stocking class, and the items of number of photo plots in the field class stratum, correction factor, field class stratum number, and total number of field class strata.

The Area Correction Factor Master Deck No. 52 will be listed as described in section 2.634, and the deck will be used as described in section 2.543.

2.54 Preparation of Area Work Deck No. 07.

2.541 Punch Number of Field Class Strata. The Area Photo Stratum Master Deck No. 51, prepared in section 2.531, and the Area Sample Deck No. 01, prepared in section 2.51, will be sorted by stocking class, stand size class, local type, and land type; and merged. The total number of field class strata for each photo class stratum will be gang punched into each card No. 01.

2.542 Reproduce Area Work Deck No. 07. The Area Sample Deck No. 01 will be sorted and grouped by the total number of field class strata code. The Area Work Deck No. 07, described in section 16.06, will be reproduced from the Deck No. 01. One card No. 07 will be made for each card No. 01; and one complete Deck No. 07 will be made for each field class stratum of each original photo class stratum.

One Deck No. 07 will be made for the total number of field class strata code 01 of deck No. 01, two decks will be made for code 02, three decks for code 03, etc. As each Deck No. 07 is reproduced, the field class stratum number will be emitted into each card No. 07; i.e., for the first reproduction of Deck No. 07 for each field class strata code emit field class stratum number 01, for the second reproduction emit 02, for the third emit 03, etc.

Each card No. 07 will contain the control items: state, subregion, survey unit, and block; the photo class items of land type, local type, stand size class, and original number of photo class plots; and the field class stratum number and total number of field class strata for each original photo class stratum.

2.543 Application of Area Field Check Correction Factors. The Area Correction Factor Master Deck No. 52, prepared in section 2.532, and the Area Work Deck No. 07 will be sorted by field class stratum number, and the photo class items of stocking class, stand size class, local type, and land type; and merged. The field class control items of land type, local type, stand size class, and stocking class will be gang punched into each card No. 07. Then the corrected number of photo plots for each field class stratum will be calculated and punched into each Card No. 07. This will be done by applying the correction factors in Deck No. 52 to the original number of photo plots for each photo class stratum in Deck No. 07. The Calculation will be proved using the tabulator as described in section 2.635.

2.55 Preparation of Area Summary Deck No. 02. The Area Work Deck No. 07 will be sorted by the field class control items: stocking class, stand size class, local type, and land type; and block to place all of the cards with identical control items together in a control group. The Deck No. 07 will be tabulated and the corrected number of photo plots will be accumulated for each control group of cards, as described in section 2.636.

As the Area Work Deck No. 07 is tabulated, the Area Summary Deck No. 02, described in section 16.02, will be summary punched. One card No. 02 will be punched automatically for each control group of Deck No. 07. Each card No. 02 will contain the items: state, subregion, survey unit, block, land type, local type, stand size class, stocking class, and total number of photo plots.

The Deck No. 02 will be sorted and grouped by local type as in section 17.2(50) and the major type will be gang punched. The volume stratum code will be gang punched later if necessary.

2.56 Area Blow Up Master Deck No. 50. The Area Blow Up Master Deck No. 50, described in section 16.51, will be key punched and verified from the Tables of Area Control Data, described in section 2.4. One card will be punched for each survey unit. Each card will contain the items: state, subregion, survey unit, total number of photo plots, total land area, and area blow up factor. This card will not be listed unless the ARC request it.

2.57 Acreage Calculation. The one card of the Area Blow Up Master Deck No. 50 will be placed in front of the cards of the Area Summary Deck No. 02. The acres will be calculated and punched into each card No. 02, by applying the blow up factor to the number of dots. This calculation will be proved using the tabulator, as described in section 2.637.

2.58 Use of Deck No. 02. The Area Summary Deck No. 02 will be used to prepare the Area/Volume Deck No. 03, as described in section 7.1; and to prepare the area summary tabulations for reports as described in sections 2.61 and 2.62.

2.6 Area Summary Tabulations. The area summary tabulations that will be sent to the ARC regularly for each survey unit are described in this section. Other tabulations of area can be prepared if desired. The requests for special area summary tabulations should be accompanied by specific instructions giving the deck of cards to use, the control items to be included, the acreage totals desired, and a table outline with complete headings and explanatory notes.

2.61 Forest Survey Report Tables. The area summary tabulations for the Forest Survey report tables are described and illustrated below. The Area Summary Deck No. 02 for a survey unit will be used to prepare these tabulations.

2.611 FS Table 1 - Survey Unit Land Area by Major Classes of Land.

The cards will be sorted by land type, and minor and final totals of acres will be accumulated.

The form of FS Table 1 is:

State	Subregion	Survey unit	Land type	Sum of acres by Land type	Sum of acres by Survey unit
02	x	xx	x	8x's*	
			etc	etc	
					8x's*

2.612 FS Table 2 - Land Area of Timber Management Blocks by Major Classes of Land. The cards will be sorted by land type and block; and minor, intermediate, and final totals of acres will be accumulated.

The form of FS Table 2 is:

State	Subregion	Survey unit	Block	Land type	Sum of Acres by Land type	Sum of Acres by Block	Sum of Acres by Survey unit
02	x	xx	xx	x	8x's*		
				etc	etc	8x's*	
			xx	etc	etc	etc	
			etc	etc	etc	etc	
							8x's*

2.613 FS Table 3 - Commercial Forest Land Area by Ownership Class. This table cannot be prepared from the cards because ownership is not included as a control item of the area sample data. The survey unit total area of commercial forest land from FS Table 1 can be proportioned to the ownerships to obtain the data for this table.

2.614 FS Table 4 - Area of Commercial Forest Land by Major Forest Type. The cards for commercial forest land (LT 0 and 1) will be sorted by major type and land type; and minor, intermediate, and final totals of acres will be accumulated.

The form of FS Table 4 is:

State	Sub-region	Survey unit	Land type	Major type	Major type	Land type	Survey unit
					Sum of Acres by		
02	x	xx	x	xx	8x's*		
				etc	etc	8x's*	
			x	etc	etc		
				etc	etc	etc	
							8x's*

2.615 FS Table 5 - Commercial Forest Land Area of Timber Management Blocks by Local Forest Type. The cards for commercial forest land (LT 0 & 1) will be sorted by local type, land type; and block, and minor, intermediate, major, and final totals of acres will be accumulated.

The form of FS Table 5 is:

State	Sub-region	Survey unit	Block	Land type	Local type	Local type	Land type	Block	Survey unit
						Sum of Acres by			
02	x	x	xx	x	xx	6x's*			
					etc	etc	8x's*		
				x	etc	etc	etc		
				etc	etc	etc	etc	8x's*	
			xx	etc	etc	etc	etc	etc	
			etc	etc	etc	etc	etc	etc	
									8x's*

2.616 FS Table 6 - Area of Commercial Forest Land by Stand Size Class and Stocking Class. The cards for commercial forest land (LT 0 & 1) will be sorted by stocking class, stand size class, and land type; and minor, intermediate, major, and final totals of acres will be accumulated.

The form of FS Table 6 is:

State	Sub region	Survey unit	Land type	SSC	SC	SC	SSC	LT	Survey unit
						Sum of Acres by			
02	x	xx	x	x	xx	6x's*			
					etc	etc	6x's*		
				x	etc	etc	etc		
				etc	etc	etc	etc	8x's*	
			x	etc	etc	etc	etc		
			etc	etc	etc	etc	etc	etc	
									8x's*

2.617 FS Table 7 - Area of Young Growth Stands on Commercial Forest Land by Stand Size Class and Stocking Class. The data needed for this table are available from FS Table 6, section 2.616. Therefore, no summary tabulation will be prepared for FS Table 7.

2.618 FS Table 8 - Area of Commercial Forest Land by Timber Management Blocks and Stand Size Class.

The cards for commercial forest land (LT 0 and 1) will be sorted by stand size class and block; and minor, intermediate, and final totals of acres will be accumulated.

The form of FS Table 8 is:

St.	Sub region	Survey unit	Block	SSC	SSC	Block	Survey unit
02	x	xx	xx	x	8x's*		
				etc	etc	8x's*	
			xx	etc	etc	etc	
			etc	etc	etc	etc	
							8x's*

2.62 Area Error Tables. The summary tabulation prepared for each survey unit for use in the area sample error calculations is described and illustrated below.

2.621 A. E. Table 1 - Number of Photo Plots Sampled and Total Land Area by Survey Unit and Block. The Area Summary Deck No. 02 will be sorted by land type and block; and minor and final totals of the number of photo plots, and the area of LT 0, LT 1, and all land types will be accumulated.

The form of A. E. Table 1 is:

				Block Totals				Survey Unit Totals			
				No. of	Area of			No. of	Area of		
		Sur-		photo			All	photo			All
	Sub	vey		plots			land	plots			land
State	region	unit	Block	(2 dec)	LT 0	LT 1	types	(2 dec)	LT 0	LT 1	types
02	x	xx	xx	6x's*	6x's*	8x's*	8x's*				
			xx	etc	etc	etc	etc				
			etc	etc	etc	etc	etc				
								6x's*	6x's*	8x's*	8x's*

2.63 Other Tables. The listings and summary tabulations prepared as a part of compiling the survey unit areas are described and illustrated below:

2.631 Area Table A - Listing of Area Sample Deck No. 01. This table is referred to in section 2.51 and it will be prepared if requested by the ARC.

The Area Sample Deck No. 01 will be sorted by stocking class, stand size class, local type, land type, and block; all data punched in each card will be listed; and minor intermediate and final totals of the number of photo plots will be accumulated.

The form of Area Table A is:

State	Sub region	Survey unit	Block	LT	T	SSC	SC	No. of photo Plots	Total No. of Photo Plots by LT	Block	Survey unit
02	x	xx	xx	x	xx	x	xx	xxxx			
etc	etc	etc	etc	etc	etc	etc	etc	etc			
End of listing for all cards of a land type									6x's*		
End of listing for all cards of a Block										6x's*	
End of listing for all cards of the Survey Unit											6x's*

2.632 Area Table B - Listing of Area Check Deck No. 06. This table is referred to in section 2.52 and it will be prepared if requested by the ARC.

The Area Check Deck No. 06 will be sorted by the field classes of site, stocking class, stand size class, local type, and land type, and the photo classes of stocking class, stand size class, local type, and land type; all data punched in each card will be listed; and minor, intermediate, and final totals of the number of cards will be accumulated.

The form of Area Table B is:

St.	Sub region	Survey unit	Photo Classes LT	T	SSC	SC	Field Classes LT	T	SSC	SC	Site	Number of Plots by Photo class stratum	Photo class land type	Survey unit
02	x	xx	x	xx	x	xx	x	xx	x	xx	xx			
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc			
End of listing for all cards of a Photo Class LT/T/SSC/SC stratum												4x's*		
End of listing for all cards of a Photo Class LT													4x's*	
End of listing for all cards of the Survey Unit														4x's*

2.633 Area Table C - Number of Photo Plots Checked by Field Class Within Photo Class, and Summary Punching Area Photo Stratum Master Deck No. 51. This table is prepared in sections 2.53 and 2.531.

The Area Check Deck No. 06 will be sorted by the field class items of stocking class, stand size class, local type, and land type, and the photo class items of stocking class, stand size class, local type, and land type; minor, intermediate, and final totals of the number of plots will be accumulated; intermediate totals of the controls, and number of minor control breaks will be accumulated and summary punched; and final totals of the controls, number of intermediate control breaks, and number of minor control breaks will be accumulated.

The form of Area Table C is:

St. 1/	Sub region 1/	Survey unit 1/	Photo Classes 1/ LT	Photo Classes 1/ T	Photo Classes 1/ SSC	Photo Classes 1/ SC	No. of plots by photo class	Field Classes LT	Field Classes T	Field Classes SSC	Field Classes SC	No. plots by field class	Number of field classes 1/
02	x	xx	x	xx	x	xx		x	xx	x	xx	2x's*	
							4x's*	etc	etc	etc	etc	etc	2x's*
			x	xx	x	xx		etc	etc	etc	etc	etc	
							etc						etc
			etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc

1/ Summary punched into Deck No. 51.

In addition, final totals will be printed at the end of the above run as follows:

Final Totals of			
Number of plots	Controls	No. of intermediate control breaks	Number of minor control breaks
4x's*	6x's*	4x's*	4x's*

The summary punched Area Photo Stratum Master Deck No. 51 will be tabulated at the end of the above table and final totals printed as follows:

State	Sub Region	Survey unit	Final Totals of Controls	No. of Cards	No. of Field Classes
02	x	xx	6x's*	4x's*	4x's*

2.634 Area Table D - Listing of Area Correction Factor Master Deck No. 52. This table is referred to in section 2.532 and it will be prepared if requested by the ARC.

The Area Correction Factor Master Deck No. 52 will be sorted by the field class items of stocking class, stand size class, local type, and land type, and the photo class items of stocking class, stand size class, local type, and land type, all data punched in each card will be listed, minor and final totals of the number of plots field checked and the card count will be accumulated and the final total of the original number of plots (on first card minor) will be accumulated.

The form of Area Table D is:

St	Sub reg-ion	Sur-vey unit	Photo Class LT	Photo Class T	Photo Class SSC	Photo Class SC	Orig-inal no. of plots	Field Class LT	Field Class T	Field Class SSC	Field Class SC	No. plots field checked	Correc-tion factor 4 dec.	Field strat no	Total no. of field strat
02	x	xx	x	xx	x	xx	xxxx	x	xx	x	xx	xxxx	xxxxx	xx	xx
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc

The data punched in each card will be listed as indicated above. In addition, totals will be accumulated as indicated below:

	Photo Class Stratum Totals: No. plots field checked	No. of field strata	Survey Unit Totals: No. plots field checked	No. field strata	Original no. plots
End of listing for all cards of a photo class stratum	6x's*	4x's*			
End of listing for all cards of the survey unit			6x's*	4x's*	6x's*

2.635 Area Table E - Proof of Calculation of Corrected Number of Photo Plots. This table is prepared in section 2.543.

The Area Work Deck No. 07[1] will be tabulated to accumulate the minor and final totals of the original number of plots (on first card minor) and the corrected number of plots.

1/ The cards must be in proper order by the photo class stratum control items.

The form of Area Table E is:

						Photo Class Stratum Totals		Survey Unit Totals	
Sub reg-ion	Sur-vey unit	Photo Classes LT:	T	SSC:	SC	Original no of plots	Corrected no of plots 2 dec	Original no of plots	Corrected no of plots 2 dec
02	x	xx	x	xx	x	xx	4x's*	6x's*	
			etc	etc	etc	etc	etc	etc	
									6x's* 8x's*

The calculation of the corrected number of plots will be proved for each photo class stratum and for the survey unit by comparing the sum of the original number of plots with the sum of the corrected number of plots. The two sums must be equal.

2.636 Area Table F - Tabulation of Area Work Deck no. 07 for summary punching Area Summary Deck no. 02. This table is prepared in section 2.55.

The Area Work Deck no. 07 will be sorted by the field class control items of stocking class, stand size class, local type, and land type, and block; minor totals of the controls and corrected number of plots will be accumulated and summary punched; and final totals of the controls, numbers of minor control breaks, and corrected number of plots will be accumulated.

The form of Area Table F is:

								Corrected no. of plots by field class (2 dec)	Final Totals of			
Sub reg-ion	Sur-vey unit	Block	Field Class LT:	T	SSC:	SC			Controls	No of minor control breaks	Corrected no. of plots (2 dec)
02	x	xx	xx	x	xx	x	xx	6x's*			
etc	etc	etc	etc	etc	etc	etc	etc	etc			
									8x's*	4x's*	8x's*

The summary punched Area Summary Deck No. 02 will be tabulated at the end of the above table and final totals printed as follows:

State	Sub region	Survey unit	Controls	Final Totals of No. of cards	Corrected no. of plots (2 dec.)
02	x	xx	8x's*	4x's*	8x's*

2.637 Area Table G - Proof of Acreage Calculation.

This table is prepared in section 2.57. The merged Area Blow Up Master Deck No. 50 and the Area Summary Deck No. 02 will be tabulated to accumulate final totals of the number of photo plots, the acres, and the number of cards in Deck No. 02.

The form of Area Table G is:

St.	Sub Region	Survey unit	Total no. photo plots	Total land area	Area blow up factor (5 dec.)	Final Totals of No. of plots 2 dec	Acres	No. of cards deck no. 02
02	x	xx	xx	xx,xxx	xx,xxx,xxx	xxx,xxxxx	8x's*	8x's*	4x's*

The calculation of the sample unit acres will be proved by comparing the total acres with the total land area in the above table, and also in the Table of Area Control Data. The two acreage figures must be the same.

VOLUME

3. IBM MASTER DECKS FOR VOLUME.

The data that will be used repeatedly in the compilation of volume will be placed in IBM master decks. These master decks will be used in compiling the volume data as indicated below and as described in more detail in other sections of this Plan.

The preparation of the IBM master decks usually is a one-time job; but they can be revised as better data becomes available. Each master deck will be listed and a copy of the listing sent to the ARC. All of the items punched in each card will be printed on the listings.

3.1 2" DBH Class and 10" DBH Group Master Deck No. 60. The purpose of this deck is to assign a 2" DBH class and a 10" DBH group to each tree. The master deck will be reproduced from the INT-FS 2" DBH class and 10" DBH Group Master Deck No. 60. One card will be prepared for each one inch of diameter included in each 2" DBH Class, beginning with 1 inch. Each card will contain the items: state, 1" DBH, 2" DBH class, and 10" DBH group. The Master Deck No. 60 is described in section 16.6(1).

3.2 Volume Table Master Deck No. 62. The purpose of this deck is to assign the cubic foot and the Scribner Dec. C gross volumes to each tree. These tree gross volumes are contained in the Tree Volume Tables, described in section 15.23.

The Volume Table Master Deck No. 62, described in section 16.6(2), will be key punched and verified from the Tree Volume Tables. One card will be prepared for each volume entry in the Tables. Each card will contain the items: state, species group, species, 2" DBH class, 10" DBH group, log height, and the tree cubic foot and Scribner Dec. C gross volumes.

The Volume Table Master Deck No. 62 will be used with the Tree Work Deck No. 21, as described in section 5.22.

3.3 Merchantability Factor Master Deck No. 64. This master deck will be used in the Calculation of the net volume for the merchantable sawtimber trees of the indicator species.1/ The average merchantability factors for the indicator species are contained in the Table of Average Merchantability Factors, described in section 15.24.

1/ The indicator species are: 42 Sitka Spruce; 48 Hemlock; 52 Alaska Cedar; and 54 Western redcedar.

The Merchantability Factor Master Deck No. 64, described in section 16.6(3,), will be key punched and verified from the Table of Average Merchantability Factors. One card will be prepared for each merchantability factor entry in the Table. Each card will contain the items: state, species group, species, 2" DBH class, merchantability class, merchantability code, and the average merchantability factors for cubic foot and board foot volumes.

The Merchantability Factor Master Deck No. 64 will be used with the Tree Volume Deck No. 11 as described in section 5.321, and with the Tree Growth Deck No. 31 as described in section 14.261.

3.4 Scribner to International 1/4" Ratio Master Deck No. 66. This master deck will be used to convert the Scribner b.f. net volume to International 1/4" b.f. net volume. The ratios are contained in the Table of Scribner to International 1/4 - inch Ratios--described in section 15.26.

The Scribner to International 1/4" Ratio Master Deck No. 66, described in section 16.6(5), will be key punched and verified from the above named Table. One card will be punched for each 10" DBH group of each species or group of species. Each card will contain the items: state, species group, species, 10" DBH group, and the Scribner to Int. 1/4" ratio.

The Master Deck No. 66 will be used with the Volume Stratum 10" DBH Group net volume per Acre Summary Deck No. 32 as described in section 6.25, the Tree Volume Deck No. 11 as described in section 13.213, and the Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32 as described in section 14.36.

3.5 Location Volume Blow Up Master Deck No. 68. This single master card will be key punched and verified with the location mortality volume blow up factor from section 17.2(21), the location pole-timber volume blow up factor from section 17.2(22), the location sawtimber quality volume blow up factor from section 17.2(24), the plot poletimber volume blow up factor from section 17.2(35), and the plot sawtimber volume blow up factor from section 17.2(36).

The Location Volume Blow up Master Deck No. 68, described in section 16.6(7), will be used with the Location Merchantable Volume Error Summary Deck No. 20 as described in section 10.21; the Location Mortality Volume Error Summary Deck No. 29 as described in section 10.22; the Log Volume Deck No. 40 as described in section 11.33; the Tree Volume Deck No. 11 as described in section 11.4; the Plot Volume Summary Deck No. 30 as described in section 13.222; and the Location Growth Error Summary Deck No. 39 as described in section 14.92.

3.6 Sawlog Cubic Volume Factor Master Deck No. 69. The purpose of this master deck is to convert the species and diameter group cubic foot total net volume to sawlog cubic foot total net volume and to calculate the hardwood limbwood total net volume. The conversion factors are contained in the Table of Sawlog Cubic Volume Factors described in section 15.29.

The Sawlog Cubic Volume Factor Master Deck No. 69, described in section 16.6(8), will be key punched and verified from the Table of Sawlog Cubic Volume Factors. One card will be punched for each species/10" DBH group. Each card will contain the items: state, subregion, survey unit, merchantability class, kind of volume, species group, species, 10" DBH group, and the sawlog cubic volume factor. In addition, the cards for the hardwood species will contain the hardwood limbwood factor.

The Master Deck No. 69 will be used in calculating the sawlog cubic volume of merchantable trees as described in section 83.

3.7 Breakage Factor Master Deck No. 70. The purpose of this deck is to convert the Scribner b.f. woods gross volume to net volume. The breakage factors are contained in the Table of Breakage Fracors described in section 15.25.

The Breakage Factor Master Deck No. 70, described in section 16.6(9,) will be key punched and verified from the Table of Breakage Factors. One card will be punched for each species of each land type. Each card will contain the items: state, subregion, survey unit, land type, merchantability class, species group, species, and the breakage factor.

The master deck no. 70 will be used with the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12, as described in section 6.24, and with the Tree Volume Deck No. 11 as described in section 13.212.

3.8 Volume Conversion Factor Master Deck No. 71. The purpose of this deck is to assign the volume conversion factors to the volume strata based on the number of plots sampled and the 10" DBH Group of the trees in the sample.

The Volume Conversion Factor Master Deck No. 71, described in section 16.6(10), will be prepared in three steps as follows.

The first portion of the Deck No. 71 will be key punched and verified without reference to a table. Each card will contain the items: state, 10" DBH group, number of plots sampled, and individual plot size. One card will be punched for each possible number of plots sampled from 3 through 300;

i.e. for 003, 006, 009, etc, plots. A total of 100 cards will be key punched. This first key punched portion of the Deck No. 71 will contain the 10" DBH group code 1 and the individual plot size of 0.025 acres.

The first key punched portion of Deck No. 71 will be used to reproduce the second portion of the deck which will contain the 10" DBH group Code 2 and the individual plot size of 0.200 acre.

The total acres sampled and the volume conversion factor will be calculated and punched into each card of the first and second portions of Deck No. 71. This will be done by multiplying the number of plots sampled by the individual plot size to give the total acres sampled (six digits, three decimals); and calculating the reciprocal of the total acres sampled to give the volume conversion factor (eight digits, five decimals). These Calculations will be proved using the calculator.

The second portion of Deck No. 71 for 10" DBH group 2, plot size 0.200 acre will be used to reproduce the third portion of the deck. The second portion will be reproduced for each of the remaining 10" DBH groups 3,4, and 5; each reproduction containing the proper 10" DBH group code, but the same individual plot size, total acres sampled, and volume conversion factor as for the 10" DBH group 2.

The three portions will be combined into the single Volume Conversion Factor Master Deck No. 71, for use with the Volume Stratum Average Volume per Acre Calculation Master Deck No. 65, as described in section 6.22.

4. THE VOLUME SAMPLE.

4.1 Field Locations, Plots, and Sub plots. The basic unit of the volume sample for each survey unit is the field location. The number of field locations required to give an estimate of merchantable volume within the prescribed sampling error will be determined for each survey unit. The total number of photo plots on commercial forest land will be divided by the total number of field locations required to give the sampling interval for each survey unit.

The first photo plot to be used as a field location will be selected at random from the photo plots within the limits of 1 to n of the sampling interval of n. Subsequent field locations will be established systematically at every nth photo plot on commercial forest land. The field locations will bear the number of the original photo plot, and these numbers may not begin with 0001 and will not be consecutive within a survey unit.

The units of area, at each field location, for which all volume, quality, and growth data will be measured are the sample plots and their sub plots. Three sample plots will be established at each field location. These sample plots will be rectangular in shape and spaced 2 chains apart. The three plots at each location must be entirely within the same land type and stand size class, but they may be in different local types and stocking classes. The sample plots at each field location will be numbered 1, 2, and 3. The sub plots at each sample plot are distinguished only by the kind of data obtained on each size sub plot.

The size of the four sub plots taken at the sample plots of the field locations and the kinds of data measured on each sub plot are:

1/200 acre subplot: Volume data for merchantable sapling trees 1.0" to 4.9" d.b.h.; and growth data for merchantable poletimber trees 5.0" to 10.9" d.b.h.

1/40 acre subplot: Volume data for live and mortality poletimber trees 5.0" to 10.9" d.b.h.

1/20 acre subplot: Quality data for merchantable sawtimber spruce and hemlock trees 11.0" d.b.h. and over; and growth data for merchantable sawtimber trees 11.0" to 40.9" d.b.h.

1/5 acre subplot: Volume data for live, mortality, and solvable dead sawtimber trees 11.0" d.b.h. and over; and growth data for merchantable sawtimber trees 41.0" d.b.h. and over.

Volume sample data will be obtained on all plots and subplots of each field location. Quality sample data will be obtained only on the subplots of the odd numbered field locations. Growth sample data will be obtained only on the plots and subplots of the field locations that are in young growth sawtimber or poletimber stands. Each tree in these samples will be numbered, beginning with number 1 on each sample plot.

The data that will be recorded for each field location and sample plot, and for each tree on the various subplots, are described in section 4.2 of this Plan and in more detail in the Field Manual. The layout of the subplots is illustrated in the Field Manual; also additional information is given for the quality sample in section 11.1, and about the growth sample in section 12.

4.2 Plot Record, Form 1 Rev. 1956. The Plot Record will be used to receive the entries of the descriptive and control items of data for each sample plot; and for each tree in the volume, quality, and growth samples on the various sub plots. All items of data that will be transferred into IBM cards must be recorded in code on the Plot Record. The Plot Record is illustrated in section 15.21, and the instructions for entering the codes are given in section 17.

4.21 Recording Plot Control Items. One or more Plot Records will be used for recording the items of data for each sample plot. The plot control items of state, subregion, survey unit, block, location/plot number, land type, local type, stand size class, stocking class, site, stand age, and stand height must be filled in completely in code for each sample plot. These items must be filled in even if they are common items for the three sample plots at a location. The codes for state, subregion, survey unit, block, location number, land type, and stand size class must be the same for the three plots at a location. The codes for plot numbers, local type, stocking class, site, stand age, and stand height may be different for the three sample plots at a location.

4.22 Recording Tree Control Items. The tree control items will be recorded in code in the body of the Plot Record. One line will be used to record the data for each tree, except for quality sample trees with quality logs in other than the first four log positions. The data for live sapling, pole-timber, and sawtimber trees will be recorded on the front of the Plot Record. If more than 20 live trees are found on a plot, the tally may be continued on the back of the form in the Live PT and ST section. However, all live merchantable PT and ST trees in the growth and quality samples must be tallied on the front of the Plot Record. The data for mortality PT and ST trees and for salvable dead ST trees will be recorded on the back of the form. If more trees are found on a sample plot than are provided for on a Plot Record, then another form must be used for that sample plot.

The data will be recorded for each class of tree as described in the following sub sections.

4.221 Live Sawtimber Trees. Live sawtimber trees are the merchantable, sound cull, or rotten cull trees 11.0" d.b.h. and over. The control items of tree number, species, 2" DBH class, log height, merchantability class, and merchantability code or factor (see section 17.2(30)) must be filled in completely in code for each tree. In addition, for the live merchantable sawtimber trees on the growth sample plots, the items of 1/10" DBH, diameter growth 0-5 years and 0-10 years, and double bark thickness must be recorded in code. These growth sample data will not be recorded for the growth sample trees on which normal d.b.h. cannot be measured. The data will be supplied for these trees as described in section 4.23.

If the live merchantable sawtimber tree is on the 1/20 acre sub plot of an odd numbered field location and is a spruce or hemlock, the tree is a quality sample tree. For these quality

sample trees, the items of log grade and log merchantability factor must be recorded in code. The log grade and merchantability factor are recorded only for the quality logs or for the other logs that are below a quality log in log position of quality sample trees. If a quality sample tree has no quality logs, this fact is coded in the log grade column of position 1 for the tree. (See also sections 17.2(25) and 17.2(26)). If a quality sample tree has quality logs (including the other log below a quality log) in other than the first four log positions, the data for the additional quality logs will be recorded on the next line using the position 1 columns for the 5th log and continuing until all quality logs are recorded. No tree control data other than the tree number need be recorded on the second line for the quality sample trees with quality logs in other than the first four log positions.

The growth and quality items may be left blank for live sawtimber trees that are not growth or quality sample trees.

4.222 Live Poletimber Trees. Live poletimber trees are the merchantable, sound cull, or rotten cull trees from 5.0" to 10.9" d.b.h. The control items of tree number, species, 2" DBH class, log height, merchantability class, and merchantability factor must be recorded completely in code for each tree. In addition, for the live merchantable poletimber trees on the growth sample plots, the items of 1/10" DBH, diameter growth 0-5 years and 0-10 years, and double bark thickness must be recorded in code. These growth sample data will not be recorded for the growth sample trees on which normal d.b.h. cannot be measured. The data will be supplied for these trees as described in section 4.23. The growth items may be left blank for live poletimber trees that are not growth sample trees; and the quality items may be left blank for all live poletimber trees.

4.223 Live Sapling Trees. Live sapling trees are the merchantable trees from 1.0" to 4.9" d.b.h. The control items of tree number, species, 2" DBH class, log height, merchantability class, and merchantability factor must be recorded in code for each tree. The growth and quality items may be left blank for all live sapling trees.

4.224 No Live Merchantable Trees. An entry must be made in the Plot Record for each sample plot that has no live merchantable sawtimber or poletimber trees. The codes for no live merchantable trees on the plot will be entered for the tree control items tree number, species, 2" DBH class, log height, merchantability class, merchantability factor, and cause of death.

4.225 Mortality Poletimber and Sawtimber Trees. Mortality poletimber and sawtimber trees are the trees 5.0" d.b.h. and over that are estimated to have died within the past 5 years and that were merchantable at the time of death. Mortality trees will be tallied in the mortality section of the Plot Record. Mortality ST trees that are salvable, also will be tallied as salvable dead trees. The tree control items of tree number, species, 2" DBH class, log height, merchantability factor, and cause of death will be recorded in code for each mortality tree.

4.226 Salvable Dead Sawtimber Trees. Salvable dead sawtimber trees are the dead trees 11.0" d.b.h. and over that contain at least one merchantable sawlog and with 50 percent or more of the tree board foot gross volume in sound material. These trees will be tallied in the Salvable Dead section of the Plot Record. Salvable dead trees that have died within the last 5 years, also will be tallied as mortality trees. The tree control items of tree number, species, 2" DBH class, log height, and merchantability factor will be recorded in code for each salvable dead tree.

4.23 Growth Data for Sample Trees with Abnormal DBH.

The growth sample items of 1/10" DBH, diameter growth 0-5 years and 0-10 years, and double bark thickness will not be measured for the sample trees for which it is impossible to measure normal d.b.h. These items will not be recorded for these sample trees when the field measurements are taken on the plot location, but the 2" DBH class will be estimated and recorded. However, the growth sample items must be recorded on the Plot Record for the sample trees with abnormal d.b.h. before the Plot Records are transmitted to the IBM Service Unit.

The ARC will supply the growth sample data for the sample trees with an abnormal d.b.h., as follows:

(1) 1/10" DBH Class - The 2" DBH Class was estimated. This estimate also will be recorded in the 1/10" DBH column and a zero will be added to the right for the 1/10 - inch position. This procedure assumes that the tree falls at the mid-point of the 2 - inch class. It will provide the present 1/10" DBH class from which the 1/10" DBH class 10 years ago can be calculated.

(2) Diameter growth, 0-5 years and 0-10 years, and double bark thickness - The averages of these items for the growth sample trees with normal d.b.h. will be calculated, poletimber separate from sawtimber. The appropriate averages

PT or ST, will be recorded for the growth sample trees with abnormal d.b.h. This procedure assumes that the diameter growth and bark thickness were average for its size class on the plot. It will provide the diameter growth for use in calculating the 1/10" DBH class 10 years ago.

The procedure given above will supply the growth sample data required for compiling growth by the tree method, as described in section 14. It will allow the trees with an abnormal d.b.h. to be processed in the regular manner and special costly procedure will not be required to obtain the growth for these trees.

4.24 Control Item Check and Transmittal of Plot Records. The plot control items and the tree control items recorded on the Plot Record must be checked thoroughly for complete, accurate, and legible codes before leaving each sample plot of a field location. The Plot Records for the three sample plots at a field location should be stapled together before transmittal to the IBM Service Unit.

The Plot Records should be sent to the IBM Service Unit by survey unit or block groups; and should be accompanied by the Table of Volume Control Data described in section 4.3. The IBM Service Unit will transfer the plot control items and the tree control items into IBM cards, as described in sections 5.1 and 5.21.

4.3 Table of Volume Control Data. A Table of Volume Control Data will be prepared for each survey unit (and block if necessary). The number of field locations in the volume sample will be recorded by land type for each block of the survey unit. In addition, the total number of field locations will be shown for the survey unit. The data in this table will be used by the IBM Service Unit to maintain control of the number of locations being compiled for a survey unit.

The Tables of Volume Control Data should be sent to the IBM Service Unit with the Plot Records to which the control data applies. The Table of Volume Control Data is illustrated in section 15.22.

5. PREPARATION OF LOCATION CONTROL AND TREE DECKS.

5.1 Location Control Deck No. 10. The Location Control Deck No. 10, described in section 16.1(1), will be key punched and verified from the heading of the Plot Records, described in sections 4.21 and 15.21. One card will be punched for each sample plot of each field location. Each card No. 10 will contain the items: state, subregion, survey unit, block, location/plot number, land type,

local type, stand size class, stocking class, site, stand age, and stand height. The cards will be sorted and grouped by local type as in section 17.2(50) and major type will be gang punched.

The Location Control Deck No. 10 will be listed if requested by the ARC, as described in section 9.2(1). This deck will be used in preparing the summary of the number of plots sampled, as described in section 6.21; in the quality compilation as described in section 11.61; in the growth compilation as described in sections 13.221 and 14.32; and in the growth error compilation as described in section 14.91.

5.2 Tree Work Deck No. 21.

5.21 Key Punch and Verify. The Tree Work Deck No. 21, described in section 16.1(10), will be punched and verified from the heading and body of the Plot Records, described in sections 4.21, 4.22, and 15.21. One card will be punched for each merchantable, sound cull, rotten cull, mortality, or salvable dead sapling, poletimber, or sawtimber tree on the Plot Record; except that two cards will be punched for each quality sample tree that has graded logs in other than the first five log positions. All of the plot control items described in section 5.1 except site, stand age, and stand height will be punched in each card. In addition, each card will contain the tree control items of: tree number, species, 2" DBH class, log height, merchantability class, merchantability code or factor, cause of death, and sample tree code. The cards for trees on growth field locations also will contain the 1/10" DBH class; and the cards for the growth sample trees will contain, in addition, the items: diameter growth 0-5 years and 0-10 years, and double bark thickness. The cards for the quality sample trees also will contain the log grade and the log merchantability factor by log position of each graded log.

Two cards No. 21 will be prepared for quality sample trees with 6 or more graded logs. The first card will contain all of the plot and tree control data and the quality data for log positions 1 through 5. The second card also will contain all of the control data but will contain the quality data for log positions 6 through 10. These cards will be distinguished by the sample tree code (see section 17.2(37)).

Items that are not coded on the Plot Records, for trees that are not growth or quality sample trees, will be left blank in the Tree Work cards for these trees. An identifying X will be punched in column 77 of the card No. 21 for no live merchantable trees on the plot when one (or more) plot(s) at a location has live merchantable trees.

5.22 Gang Punch Tree Volumes, Species Group, and 10" DBH Group. The Tree Work Deck No. 21 will be sorted by log height, 2" DBH class, and species and merged with the Volume Table Master Deck No. 62 prepared in section 3.2. The cubic foot and Scribner Dec C tree gross volumes, the species group, and the 10" DBH group will be gang punched into each card No. 21 from the master deck No. 62.

5.23 Gang Punch Major Type. The Tree Work Deck No. 21 will be sorted and grouped by local type as in section 17.2(50) and the major type will be gang punched.

5.24 Use of Deck No. 21. The Tree Work Deck No. 21 will be listed, if requested by the ARC, as described in section 9.2(2). This deck will be used to prepare: the Tree Volume Deck No. 11 as described in section 5.31, the Log Volume Deck No. 40 as described in section 11.31, and the Tree Growth Deck No. 31 as described in section 14.21.

5.3 Tree Volume Deck No. 11.

5.31 Reproduce Deck No. 11. The Tree Work Deck No. 21 will be sorted on the sample tree code and the cards with codes 0, 1, 7, 8, and 9 will be selected for use. The cards with code 2, the second card for quality sample trees with 6 or more graded logs, will be used later as described in section 11.31. The selected cards will be sorted on 10" DBH group to select the cards with codes 1, 2, 3, 4, and 5. The cards with code 0, for sapling trees, will not be used.

The selected cards of Deck No. 21, for PT and ST trees, will be used to reproduce the Tree Volume Deck No. 11, described in section 16.1(2). One card no. 11 will be prepared for each selected card No. 21. Each card No. 11 will contain the items: state, subregion, survey unit, block, location/plot number, land type, local type, stand size class, stocking class, major type, tree number, species group, species, 2" DBH class, 10" DBH group, log height, merchantability class, merchantability code or factor, cause of death, sample tree code, and the tree cubic foot and Scribner Dec. C grass volumes. The X punch in the cards for no live merchantable trees on the plot when one (or more) plot(s) at a location has live merchantable trees, will be reproduced in column 75 of the Deck No. 11.

5.32 Calculate Cubic Foot Net and Scribner B.F. Woods Gross Volumes.

The cubic foot net and Scribner b.f. woods gross volumes will be calculated and punched in each Tree Volume Card No. 11. This will be done by applying merchantability factors to the tree gross volumes. For merchantable sawtimber trees of the indicator

species: Sitka spruce - code 42, Western hemlock - code 48, Alaska cedar - code 52, and Western redcedar - code 54, the merchantability factors are contained in a deck of master cards. The factors for all other trees are contained in each Tree Volume card.

The Tree Volume Deck No. 11 will be sorted on species and the cards for the indicator species, codes 42, 48, 52, and 54, will be selected. The indicator species cards will be sorted on merchantability class and 10" DBH group to select the merchantable (MC code 1) sawtimber (10" DBH groups 2, 3, 4, and 5) trees. The group of cards for the merchantable sawtimber indicator species will be used as described in section 5.321. The group of cards for all other trees will be used as described in section 5.322.

5.321 Merchantable ST Trees of Indicator Species. The Tree Volume Deck No. 11 for the merchantable sawtimber trees of the indicator species will be sorted by merchantability code, 2" DBH class, and species; and merged with the Merchantability Factor Master Deck No. 64, prepared in section 3.3. The merchantability factors in Deck No. 64 will be applied to the tree gross volumes in Deck No. 11 and the tree cubic foot net and Scribner board foot woods gross volumes will be punched in each card no. 11. These calculations will be proved using the tabulator as described in section 9.2(3).

5.322 All Other Trees. The Tree Volume Deck No. 11 for all trees except the merchantable ST trees of the indicator species will be sorted in order by merchantability factor and merchantability class. The merchantability factor in each card no. 11 will be applied to the tree gross volumes in each card and the tree cubic foot net and Scribner board foot woods gross volumes will be punched. These calculations will be proved using the tabulator, as described in section 9.2(4).

5.33 Use of Deck No. 11. The Tree Volume Deck No. 11 will be used to prepare the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12, as described in section 6.1; in the volume error compilation, as described in section 10.11; in the quality volume compilation, as described in section 11.4; and in the growth compilation, as described in section 13.2.

The Tree Volume Deck No. 11 also will be used to prepare Volume Table V, as described in section 9.2(21).

6. COMPILATION OF AVERAGE VOLUME PER ACRE.

The average volumes per acre will be compiled at the survey unit level for the merchantable, sound cull, rotten cull, and salvable dead

merchantability classes; and at the subregion level for the mortality merchantability class. The total cubic foot volume (KV3) will be compiled for all merchantability classes; but the International 1/4" and Scribner board foot volumes (KV 1 and 2) will be compiled only for the merchantable, mortality, and salvable dead merchantability classes.

6.1 Summary of Tree Volumes by Volume Stratum, Species, and 10" DBH Group. The Tree Volume Deck No. 11 will be sorted and grouped by merchantability class. Each merchantability class will be processed separately. The cards No. 11 will be sorted by 10" DBH group, species, stand size class, and land type to place in a control group the cards with identical control items. The Tree Volume cards will be tabulated to accumulate the sum of the tree cubic foot net and Scribner b.f. woods gross volumes for each control group of cards, as described in section 9.2(5).

As the Tree Volume Deck No. 11 is tabulated, the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12, described in section 16.1(3), will be summary punched. One card No. 12 will be punched automatically for each control group of Deck No. 11. Each card No. 12 will contain the items: state, subregion, survey unit,1/ land type, stand size class, merchantability class, species group, species, 10" DBH group, and the sum of the tree cubic foot net and Scribner b.f. woods gross volumes.2/

6.2 Average Volumes per Acre.

6.21 Number of Plots Sampled by LT/SSC Stratum. The Location Control Deck No. 10, prepared in section 5.1, will be sorted by stand size class and land type to place in a control group the cards with identical control items. The Location Control Deck No. 10 will be tabulated to accumulate the number of plots sampled for each control group of cards, as described in section 9.2(6).

As the Location Control Deck No. 10 is tabulated, the Volume Stratum Average Volume per Acre Calculation Master Deck No. 65, described in section 16.6(4), will be summary punched. One card No. 65 will be punched automatically for each control group of Deck No. 10. Each card No. 65 will contain the items:

1/ Not included as a control item in the Deck No. 12 for the mortality MC.

2/ Scribner b.f. woods gross volume will be summarized into Deck No. 12 for the sound and rotten cull M.C.'s.

state, subregion, survey unit,1/ land type, stand size class, merchantability class,2/ 10" DBH group, and the number of plots sampled. This original summary punched Deck No. 65 will contain the 10" DBH Code 1. Other decks will be reproduced from the original as described in section 6.22.

6.22 Completing the Volume Stratum Average Volume per Acre Calculation Master Deck No. 65. Four additional decks will be reproduced from the original summary punched Deck No. 65; one complete deck for each of the 10" DBH groups 2, 3, 4, and 5. These five decks will be combined into the single Volume Stratum Average Volume per Acre Calculation Master Deck No. 65, The Deck No. 65 will be sorted on number of plots sampled and 10" DBH group; and merged with the Volume Conversion Factor Master Deck No. 71, prepared in section 3.8. The conversion factor, total acres sampled, and individual plot size will be gang punched into the Deck No. 65 from the Deck No. 71.

The Volume Stratum Average Volume per Acre Calculation Master Deck No. 65 will be listed as described in section 9.2(7).

6.23 Calculate Average Volumes per Acre. The Volume Stratum 10" DBH Group net Volume per Acre Summary Deck No. 12 (all MC combined except mortality) will be sorted by 10" DBH group, stand size class, and land type; and merged with the Volume Stratum Average Volume per Acre Calculation Master Deck No. 65. The stratum total volumes will be multiplied by the conversion factor and the cubic foot net and Scribner b.f. woods gross average volumes per acre will be punched into each card No. 12. These calculations will be proved using the tabulator, as described in section 9.2(8).

6.24 Calculate Scribner B.F. Average Net Volume per Acre. The Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 for merchantability classes 1, 7, and 8 will be sorted by species, land type, and merchantability class; and merged with the Breakage Factor Master Deck No. 70, prepared in section 3.7. The Scribner b.f. woods gross average volume per acre will be multiplied by the breakage factor and the Scribner b.f. net average volume per acre will be punched in each card No. 12. This calculation will be proved using the tabulator, as described in section 9.2(9).

1/ Not included as a control item in the Deck No. 65 for the mortality MC which will be compiled at the subregion level.

2/ Special MC Codes are:

1 = Live and salvable dead volumes (regular codes 1,2,3, and 8).
7 = Mortality volume (regular code 7).

6.25 Calculate International 1/4" B.F. Average Net Volume per Acre. The Volume Stratum 10" DBH Groups Net Volume per Acre Summary Deck No. 12 for merchantability classes 1, 7, and 8 will be sorted by 10" DBH group and species; and merged with the Scribner to International 1/4" Ratio Master Deck No. 66, prepared in section 3.4. The Scribner b.f. average net volume per acre will be multiplied by the Scribner to Int. 1/4" ratio and the International 1/4" b.f. average net volume per acre will be punched in each card No. 12. This Calculation will be proved using the tabulator, as described in section 9.2(10).

6.3 Total Average Net Volume per Acre Summary.

6.31 Table of Average Volumes per Acre. The Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 will be sorted and grouped by merchantability class. Each MC group will be sorted by stand size class and land type; and tabulated to accumulate the cubic foot, Int. 1/4" b.f., and Scribner b.f. total average net volumes per Acre, as described in section 9.2(11).

The Tabulation of Deck No. 12, Volume Table K, will be sent to the ARC and they will prepare the Tables of Average Volume per Acre that are illustrated in section 15.27. A separate Table of Average Volumes per Acre will be prepared for each kind of volume with all merchantability classes[1/] represented as required.

The ARC also will record in the Table of Average Volumes per acre the volumes to be used for any non sampled LT/SSC strata. The average net volumes per acre will be recorded in the Tables as five-digit numbers with no decimals.

The ARC will send the Tables of Average Volumes per Acre to the IBM Service Unit where the data will be transferred into cards, as described in section 6.32. The ARC also will send at this time the Table of Species and Diameter Group Percents for Non Sampled Strata, as described in section 15.28.

6.32 Volume Stratum Average Net Volume per Acre Master Deck No. 67. The Volume Stratum Average Net Volume per Acre Master Deck No. 67, described in section 16.6(6), will be key punched and verified from the Tables of Average Volumes per Acre. One card will be punched for each LT/SSC stratum entry of each kind of volume. Each card No. 67 will contain the items: state,

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1/ The mortality merchantability class average net volumes per acre from Volume Table K are for a five year period. These 5-year mortality volumes must be converted to the 10 year basis before being recorded in the Table of Average Volumes per acre.

subregion, survey unit,1/ land type, stand size class, species group, kind of volume, and the average net volumes per acre for the merchantable, sound cull, rotten cull, mortality, and salvable dead merchantability classes, as required.2/ The Deck No. 67 will be listed as described in section 9.2(12).

The Volume Stratum Average net volume per Acre Master Deck No. 67 will be used in calculating the total volumes, as described in section 7.2.

1/ Included as a control item if required.
2/ See introductory statement for section 6.

7. COMPILATION OF TOTAL VOLUME.

The total volumes will be compiled at the survey unit level for the merchantable, sound cull, rotten cull, and salvable dead merchantability classes; and at the subregion level for the mortality merchantability class. The total cubic foot volume (KV3) will be compiled for all merchantability classes; but the International 1/4" (KV1) and Scribner (KV2) board foot volumes will be compiled only for the merchantable, mortality, and salvable dead merchantability classes.

7.1 Area/Volume Deck No. 03. The Area Summary Deck No. 02, prepared in section 2.58, will be sorted to select the cards for the accessible and inaccessible commercial forest land (LT 0 and 1). The Area/Volume Deck No. 03, described in section 16.03, will be reproduced from the selected cards of the Area Summary Deck No. 02. One card No. 03 will be prepared for each card No. 02. Each card No. 03 will contain the items: state, subregion, survey unit,1/ block, land type, local type, stand size class, stocking class, major type, species group, kind of volume, and acres. Two additional Decks No. 03 will be reproduced from the original, so that there will be a complete deck for each of the three kinds of volume (KV 1,2, and 3) for which total volumes will be compiled.

7.2 Total Volume Calculation. The Area/Volume Deck No. 03 will be sorted by stand size class, land type, and kind of volume; and merged with the Volume Stratum Average net Volume per Acre Master Deck No. 67, prepared in section 6.32. The acres will be multiplied by the average net volumes per acre and the total net merchantable, sound cull, rotten cull, mortality, and salvable dead volumes in M ft. will be punched into each card no. 03, as required; these calculations will be proved using the tabulator, as described in section 9.2(13).

The Area/Volume Decks No. 03 will be used to prepare the Volume Stratum Total Volume Master Deck No. 15, as described in section 7.3; to prepare the Block Volume Stratum Total Volume Master Deck No. 15X1, as described in section 8.41; to prepare the Area/Growth Deck No. 04, as described in section 14.51; to prepare Volume Error Table D, as described in section 10.314; to prepare Mortality Error Table C, as described in section 10. 323 to prepare Quality Error Table C, as described in section 11.633; and to prepare part of the Forest Survey volume and growth tables, as described in sections 9.1 and 13.51.

1/ Included as a control item if required.

7.3 Volume Stratum Total Volume Master Deck No. 15. The Area/Volume Deck No. 03 will be sorted by stand size class, land type, and kind of volume to place the cards with identical control items together in a control group. The Deck No. 03 for each kind of volume will be tabulated and the merchantability class total volumes will be accumulated for each control group of cards, as described in section 9.2(14).

As the Area/Volume Deck No. 03 is tabulated, the Volume Stratum Total Volume Master Deck No. 15, described in section 16.1(6), will be summary punched. One card No. 15 will be punched automatically for each control group of Deck No. 03. Each card No. 15 will contain the items: state, subregion, survey unit,1/ land type, stand size class, merchantability class, kind of volume, species group, and the stratum total volumes for the merchantable, sound cull, rotten cull, and salvable dead merchantability classes;1/ or the total volume for the mortality merchantability class only.

The original summary punched Deck No. 15 will contain the volumes of all of the merchantability classes, except for the mortality merchantability class. However, the merchantability class code in this deck will be for the merchantable volume (or for mortality volume), and the deck will be used for merchantable (or mortality) volume only when calculating the species volumes, as described in section 8.21. Three other decks will be reproduced as required from the original Deck No. 15 (except that none will be reproduced from the original Deck No. 15 for mortality volume); one deck for each of the merchantability classes: sound cull, rotten cull, and salvable dead. Each of these decks will contain the volume for that merchantability class. However, the original cards of Deck No. 15, that contain zero volume for a merchantability class, will not be reproduced. These Decks No. 15 will be distinguished by the kind of volume and merchantability class codes.

The Volume Stratum Total Volume Master Deck No. 15 will be used in the species total volume calculation, as described in section 8.21.

8. COMPILATION OF SPECIES AND DIAMETER GROUP TOTAL VOLUME.

The species and diameter group total volumes will be compiled at the survey unit level for the merchantable, sound cull, rotten cull, and salvable dead merchantability classes; and at the subregion level for the mortality merchantability class. The total cubic volume (KV3) will be compiled for all merchantability classes; but the International 1/4" (KV1) and Scribner (KV2) board foot volumes will be compiled only for the merchantable, mortality, and salvable dead merchantability classes.

1/ See the introductory statement for section 7.

8.1 Species and Diameter Group Percent Calculation.

8.11 Volume Stratum Species and Diameter Group Average Net Volume per Acre Summary for Decks No. 13 and No. 14. The Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12, prepared in sections 6.1 and 6.2, will be grouped by merchantability class; and each group will be processed separately. The Deck No. 12 will be sorted by 10" DBH group, species, stand size class, and land type to place the cards with identical control items together in a control group. The Decks No. 12 will be tabulated and the volumes will be accumulated for each control group of cards as described in sections 9.2(15) and 9.2(16). As the Decks No. 12 are tabulated, summary cards will be punched, as described in sections 8.111 and 8.112.

8.111 Deck No. 13. On the first run of the Decks No. 12, the Volume Stratum Total Average Net Volume per Acre Master Work Deck No. 13, described in section 16.1(4), will be summary punched. One Card No. 13 will be punched automatically for each LT/SSC stratum control group of Deck No. 12. Each Card No. 13 will contain the items: state, subregion, survey unit,1/ volume stratum (LT/SSC stratum), merchantability class, kind of volume, species group, and the volume stratum total average net volumes per acre for kinds of volume 1, 2, and 3 (except that KV 1 and 2 will not be compiled for MC 2 and 3).

The original summary punched Deck No. 13 will contain the volumes for all kinds of volume except as noted above. However, the kind of volume code in this deck will be for KV3, and the deck will be used for KV3 only when calculating the species percents, as described in sections 8.121. Two other decks will be reproduced from the original Deck No. 13, except for MC 2 and 3; one deck for KV1 and the other for KV2, each containing only the volume for that kind of volume.

The Volume Stratum Total Average Net Volume per Acre Master Work Deck No. 13 will be used in the species percent of stratum volume calculation, as described in section 8.121.

8.112 Deck No. 14 X 1. On the second run of the Decks No. 12 for each merchantability class of each kind of volume, the Volume Stratum Species and Diameter Group Total Average Net Volume Per Acre and Percent Calculation Deck No. 14X1, described in section 16.1(5), will be summary punched. One Card No. 14X1 will be punched automatically for each LT/SSC/species control group of Deck No. 12. Each Card No. 14X1 will contain the items: state, subregion,

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1/ Included as a control item if required.

survey unit,1/ volume stratum (LT/SSC stratum), merchantability class, kind of volume, species group, species, species total average net volume per acre, and the total average net volumes per acre for diameter groups 1, 2, 3, 4, and 5. The Deck No. 14X1 will be used to reproduce Deck No. 14NX1, as described in section 8.113; and in the diameter group percent calculations, as described in section 8.122.

8.113 Deck No. 14 NX1. The Deck No. 14X1, prepared in section 8.112, will be used to reproduce the Volume Stratum Species and Diameter Group Total Average Net Volume per Acre and Percent Calculation Deck No. 14NX1, described in section 16.1(5). One Card No. 14NX1 will be prepared for each Card No. 14X1. Each Card No. 14NX1 will contain the items: state, subregion, survey unit,1/ volume stratum, merchantability class, kind of volume, species group, species, species total average net volume per acre, and the total average net volumes per acre for diameter groups 1, 2, and 3. The Deck No. 14NX1 will be used in the species and diameter group percent calculations as described in sections 8.121 and 8.122.

8.12 Calculation of Percents. The species and diameter group percents will be calculated in separate runs for each KV/MC grouping of the decks of cards used.

8.121 Species Percents. The Deck No. 13 and the Deck No. 14NX1 will be sorted by volume stratum and merged. The species percent of the volume stratum total volume will be calculated and punched into each card No. 14NX1. This calculation will be proved on the tabulator, after the diameter group percents have been calculated as described in section 8.122.

8.122 Diameter Group Percents. The diameter group percents of the species total volume for groups 1, 2, and 3, will be calculated and punched into each card of Deck No. 14NX1. The diameter group percents of the species total volume for groups 4 and 5, will be calculated and punched into each card of Deck No. 14X1.

The Decks No. 14NX1 and No. 14X1 will be sorted by species and volume stratum; and merged. The percents of species volume for diameter groups 4 and 5 will be gang punched into Deck No. 14NX1 from Deck No. 14X1.

The Deck No. 14NX1 will be tabulated for proof of the calcula- of the species and diameter group percents, as described in section 9.2(17).

1/ Included as a control item if required.

8.13 Volume Stratum Species and Diameter Percent Deck No. 16. The Volume Stratum Species and Diameter Group Total Average Net Volume per acre and Percent Calculation Deck No. 14NX1 will be used to reproduce the Volume Stratum Species and Diameter Percent Deck No. 16, described in section 16.1(7). One Deck No. 16 will be prepared for each KV/MC grouping of control items. Each card No. 16 will contain the items: state, subregion, survey unit,1/ volume stratum, merchantability class, kind of volume, species group, species, species percent of stratum volume, and the percents of species volume for diameter groups 1, 2, 3, 4, and 5.

The ARC will furnish a Table of Species and Diameter Group Percents for Non Sampled Strata, illustrated in section 15.28, containing the species and diameter group percents for the strata in which no volume samples were taken. These percents will be key punched into cards No. 16 and these cards will be added to the Decks No. 16.

The Volume Stratum Species and Diameter Percent Deck No. 16 will be used in calculating the species and diameter group total volumes, as described in section 8.2; and to prepare the Block Volume Stratum Species and Diameter Percent Deck No. 16X1, as described in section 8.42.

8.2 Species and Diameter Group Total Volume Calculation.

8.21 Species Net Volumes.

The Volume Stratum Total Volume Master Deck No. 15, prepared in section 7.3, and the Volume Stratum Species and Diameter Percent Deck No. 16 prepared in section 8.13, will be sorted by volume stratum, kind of volume, and merchantability class; and merged. The stratum total volume will be multiplied by the species percents and the species total volume will be punched into each card No. 16. This calculation will be proved on the tabulator, as described in section 9.2(18).

8.22 Diameter Group Net Volumes. The Volume Stratum Species and Diameter Group Percent Deck No. 16 will be used to reproduce the Volume Stratum Species and Diameter Volume Deck No. 17, described in section 16.1(8). One Card No. 17 will be prepared for each Card No. 16. Each Card No. 17 will contain the items: state, subregion, survey unit,1/ volume stratum, merchantability class, kind of volume, species group, species, and species total volume.

1/ Included as a control item if required.

The Deck No. 16 and the Deck No. 17 will be sorted by species, volume stratum, kind of volume, and merchantability class; and merged. The species total volume will be multiplied by the diameter group percents and the diameter group volumes will be punched into each Card No. 17. These Calculations will be proved on the tabulator, as described in section 9.2(19).

The Volume Stratum Species and Diameter Volume Deck No. 17 will be used to prepare the Species and Diameter Group Total Cubic, Sawlog Cubic, and Upper Stem Cubic Volume Deck No. 23, as described in section 8.3; to prepare part of the volume summary tabulations described in section 9.1; and to prepare Volume Table V, as described in section 9.2(21).

8.23 Species Gross Volumes. The Scribner b.f. total gross volume for each species will be calculated by the ARC following the steps given below. The symbols used in these steps are:

ABF = Average breakage factor
AMF = Average merchantability factor
Snva = Sum of net volume on per acre basis
Swgva = Sum of woods gross volume on per acre basis
Swgvt = Sum of woods gross volume on tree basis
Sgvt = Sum of gross volume on tree basis
TNV = Total net volume
TWGV = Total woods gross volume
TGV = Total gross volume

(1) $ABF = \frac{Snva}{Swgva}$. The Snva and the Swgva will be obtained from Volume Table T, section 9.2(20).

(2) $AMF = \frac{Swgvt}{Sgvt}$. The Swgvt and the Sgvt will be obtained from Volume Table V, section 9.2(21).

(3) $TWGV = \frac{TNV}{ABF}$. The TNV will be obtained from FS Table 12, section 9.1(3), and the ABF from step (1).

(4) $TGV = \frac{TWGV}{AMF}$. The TWGV will be obtained from step (3) and the AMF from step (2).

8.3 Sawlog Cubic Volume Calculation. The Volume Stratum Species and Diameter Volume Deck No. 17, prepared in section 8.22, for kind of volume 3 will be sorted to select the cards for merchantability class 1. The selected cards of Deck No. 17 will be used to reproduce the Species and Diameter Group Total Cubic, Sawlog Cubic, and Upper Stem Cubic Volume Deck No. 23, described in section 16.1(11). One card No. 23 will be prepared for each of the five 10" DBH groups of each card No. 17, except that a card No. 23 will not be prepared for a 10" DBH group with zero volume. Each card No. 23 will contain the items: state,

subregion, survey unit, volume stratum, merchantability class, kind of volume, species group, species, 10" DBH group, and the 10" DBH group cubic foot total net volume.

The Sawlog Cubic Volume Factor Master Deck No. 69, prepared in section 3.6, and the Deck No. 23 will be sorted by 10" DBH group, species, and species group; and merged. The softwood and hardwood species groups will be processed separately in the following calculations. For the softwood species group, the sawlog cubic volume and the upper stem cubic volume will be calculated and punched into each card No. 23. For the hardwood species group, the sawlog cubic volume, the upper stem cubic volume, and the limbwood cubic volume will be calculated and punched into each Card No. 23. These calculations will be proved using the tabulator, as described in section 9.2(22).

The Species and Diameter Group Total Cubic, Sawlog Cubic, and Upper Stem Cubic Volume Deck No. 23 will be used to prepare part of the volume Summary tabulations, as described in section 9.1.

8.4 Sawtimber Volume by Species and Block. The special procedure described in this section will be followed in compiling the total net board foot volume of live merchantable sawtimber trees by species for each timber management block of each survey unit.

8.41 Block Total Net Volume. The Area/Volume Deck No. 03 for KV2 will be sorted by stand size class, land type, and block to place the cards with identical control items together in a control group. The Deck No. 03 will be tabulated and the merchantable total net volume will be accumulated for each control group of cards, as described in section 9.2(23). As the Area/Volume Deck No. 03 is tabulated, the Block Volume Stratum Total Volume Master Deck No. 15X1, described in section 16.1(6), will be summary punched. One Card No. 15X1 will be punched automatically for each control group of Deck No. 03. Each Card No. 15X1 will contain the items: state, subregion, survey unit, block, land type, stand size class, merchantability class, kind of volume, species group, and the stratum merchantable total net volume.

8.42 Block Species Total Net Volumes. The Volume Stratum Species and Diameter Percent Deck No. 16 for MC1, KV2, prepared in section 8.13, will be used to prepare the Block Volume Stratum Species and Diameter Percent Deck No. 16X1. One complete Deck No. 16X1 will be reproduced for each block of each survey unit. Each Card No. 16X1 will contain the items: state, subregion, survey unit, block, volume stratum, merchantability class, kind of volume, species group, species, species percent of stratum volume, and the percents of species volume for diameter groups 1, 2, 3, 4, and 5.

The Block Volume Stratum Total Volume Master Deck No. 15X1, prepared in section 8.41, and the Block Volume Stratum Species and Diameter Percent Deck No. 16X1 will be sorted by volume stratum (LT/SSC stratum) and block; and merged. The stratum total volume will be multiplied by the species percents and the species total volume will be punched into each card No. 16X1. This calculation will be proved on the tabulator, as described in section 9.2(24).

The Block Volume Stratum Species and Diameter Percent Deck No. 16X1 will be used to prepare FS Table 17, as described in section 9.1(8).

9. VOLUME SUMMARY TABULATIONS.

The summary tabulations of volume, that will be prepared and sent to the ARC regularly for each survey unit, subregion, or other area as requested, are described in this section. Other tabulations of volume can be prepared if desired. The requests for special volume summary tabulations should be accompanied by specific instructions giving the deck of cards to use, the control items to be included, the volume totals desired, and a table outline with complete headings and explanatory notes.

9.1 Forest Survey Report Tables. The volume summary tabulations for the Forest Survey report tables are described and illustrated below. The proper deck of cards for a survey unit will be used to prepare all of these tables; except that the cards for a subregion will be used for the mortality tables of sections 9.1(9) to 9.1(12).

9.1(1) FS Table 10 - Net volume of live sawtimber and growing stock on commercial forest land by accessibility class.

The Area/Volume Deck No. 03 (LT 0 and 1; KV 1, 2, and 3) will be sorted by kind of volume and land type; and minor and final totals of the merchantable total net volume will be accumulated by kind of volume.

The form of FS Table 10 is:

				Merchantable Total Net Volume MF+ by					
				Land Type			Survey Unit		
State	Sub Region	Survey Unit	Land Type	Int. 1/4"	Scribner	Cubic	Int. 1/4"	Scribner	Cubic
02	x	xx	0	8x's*	8x's*	8x's*			
			1	8x's*	8x's*	8x's*	8x's*	8x's*	8x's*

9.1(2) FS Table 11 - Net volume of live sawtimber and growing stock on commercial forest land by stand size class.

The Area/Volume Deck No. 03 (LT 0 and 1; KV 1, 2, and 3) will be sorted by kind of volume and stand size class; and minor and final totals of the merchantable total net volume will be accumulated by kind of volume.

The form of FS Table 11 is:

				Merchantable Total Net Volume MFt by					
	Sub	Survey		S S C			Survey Unit		
State	Region	Unit	S S C	Int.1/4"	Scribner	Cubic	Int.1/4"	Scribner	Cubic
02	x	xx	x	8x's*	8x's*	8x's*			
			etc	etc	etc	etc			
							8x's*	8x's*	8x's*

9.1(3) FS Table 12 - Net volume of live sawtimber and growing stock on commercial forest land by species.

The Volume Stratum Species and Diameter Volume Deck No. 17 (MC 1; KV1, 2, and 3) will be sorted by kind of volume and species; and minor and final totals of species volume will be accumulated by kind of volume.

The form of FS Table 12 is:

						Total Net Volume M Ft. by					
						Species			Survey Unit		
Sub	Sur-vey	Merch	Spec			Int	Scrib-		Int.	Scrib-	
St:region	unit	class	Gr	Species		1/4"	ner	Cubic	1/4"	ner	Cubic
02	x	xx	1	x	xx	8x's*	8x's*	8x's*			
					etc	etc	etc	etc			
				x	etc	etc	etc	etc			
									8x's*	8x's*	8x's*

9.1(4) FS Table 13 - Net volume of live sawtimber and growing stock on commercial forest land by species and diameter group.

The Volume Stratum Species and Diameter Volume Deck No. 17 (MC1; KV1, 2, and 3) will be sorted by species and kind of volume; and minor totals of the diameter group and species volumes will be accumulated.

The form of FS Table 13 is:

St	SR	SU	MC	KV	Spec Group	Species	Diameter Group total net volumes M Ft. Gr 1	Gr 2	Gr 3	Gr 4	Gr 5	All
02	x	xx	1	x	x	xx	8x's*	8x's*	8x's*	8x's*	8x's*	8x's*
						etc	etc	etc	etc	etc	etc	etc
					x	etc	etc	etc	etc	etc	etc	etc
				x	etc	etc	etc	etc	etc	etc	etc	etc
				etc	etc	etc	etc	etc	etc	etc	etc	etc

9.1(5) FS Table 14 - Net volume of all timber on commercial forest land by class of material and species group.

A. Growing Stock: The Species and Diameter Group Total Cubic, Sawlog Cubic, and Upper Stem Cubic Volume Deck No. 23 will be sorted by species group; and minor totals of the total cubic, sawlog cubic, upper stem, and hardwood limbwood cubic volumes will be accumulated by poletimber and sawtimber size trees.1/

The form of FS Table 14A is:

St	SR	SU	MC	Species group	Total Net Volumes, M Ft. Cubic: PT Trees: Total	ST Trees: Total	Sawlog	Upper Stem	Hardwood Limbwood
02	x	xx	1	1	6x's*	8x's*	8x's*	6x's*	*
				3	6x's*	8x's*	8x's*	6x's*	6x's*

1/ PT size trees = 10" DBH group 1.

ST size trees = 10" DBH groups 2, 3, 4, and 5.

B. Other Material: The Volume Stratum Species and Diameter Volume Deck No. 17 (KV3; MC 2, 3, and 8) will be sorted by species group and merchantability class; and minor totals of the diameter group and species volumes will be accumulated.

The form of FS Table 14B is:

State	SR	SU	KV	MC	Species: group	Diameter Group Total Net Volumes M Ft. Gr 1	Gr 2	Gr 3	Gr 4	Gr 5	All
02	x	xx	3	x	x	6x's*	8x's*	8x's*	8x's*	8x's*	8x's*
					etc	etc	etc	etc	etc	etc	etc
				x	etc	etc	etc	etc	etc	etc	etc
				etc	etc	etc	etc	etc	etc	etc	etc

9.1(6) FS Table 15 - All timber volume on commercial forest land by timber management blocks and kind of volume.

The Area/Volume Deck No. 03(LT 0 and 1; KV 1, 2, and 3) will be sorted by kind of volume and block and minor totals of the merchantability class total net volumes will be accumulated.

The form of FS Table 15 is:

State	Sub Region	Survey Unit	Block	Kind Volume	Total Net Volume M Ft. of Merchantable	So.cull	Ro. cull	Salvable Dead
02	x	xx	xx	x	8x's*	8x's*	8x's*	8x's*
				etc	etc	etc	etc	etc
			xx	etc	etc	etc	etc	etc
				etc	etc	etc	etc	etc

9.1(7) FS Table 16 - Scribner board foot net volume of live sawtimber on Commercial forest land by timber management blocks and stand size class.

The Area/Volume Deck No. 03 (LT 0 and 1; KV 2) will be sorted by stand size class and block; and minor, intermediate, and final totals of the merchantable volume will be accumulated.

The form of FS Table 16 is:

KV	State	Sub Region	Survey Unit	Block	SSC	Merchantable Total Net volume M Ft. by SSC	Block	Survey Unit
2	02	x	xx	xx	x	8x's*		
					etc	etc	8x's*	
				xx	etc	etc	etc	
				etc	etc	etc	etc	
								8x's*

9.1(8) FS Table 17 - Scribner net board foot volume of live sawtimber on Commercial forest land by timber management blocks and species.

The Block Volume Stratum Species and Diameter Percent Deck No. 16X1 will be sorted by species and block; and minor, intermediate, and final totals of the species total net merchantable volume will be accumulated.

The form of FS Table 17 is:

State	Sub Region	Survey Unit	Block	MC	KV	Species	Merchantable Total Net Volume, M Ft. Scribner by Species	Block	Survey Unit
02	x	xx	xx	1	2	xx	8x's*		
						etc	etc	8x's*	
			xx	1	2	etc	etc	etc	
			etc	etc	etc	etc	etc	etc	
									8x's*

9.1(7) FS Table 30 - Net volume of mortality of sawtimber and growing stock by survey unit and accessibility class.

The Area/Volume Deck No. 03 (LT 0 and 1; KV 1, 2, and 3) for a subregion will be sorted by kind of volume, land type, and survey unit; and minor and intermediate, totals of mortality volume will be accumulated by kind of volume.

The form of FS Table 30 is:

State	Sub Region	Survey Unit	Land Type	Mortality Total Net Volume M Ft. by Land Type: Int.1/4"	Scribner	Cubic	Survey Unit: Int.1/4"	Scribner	Cubic
02	x	xx	x	8x's*	8x's*	8x's*			
			etc	etc	etc	etc	8x's*	8x's*	8x's*
		xx	etc	etc	etc	etc	etc	etc	etc
		etc	etc	etc	etc	etc	etc	etc	etc

9.1(10) F. S. Table 31 - Net volume of mortality of sawtimber and growing stock on commercial forest land by survey unit and stand size class.

The Area/Volume Deck No. 03 (LT 0 and 1; KV 1, 2, and 3) for a subregion will be sorted by kind of volume, stand size class, and survey unit; and minor and intermediate totals of the mortality volume will be accumulated by kind of volume.

The form of FS Table 31 is:

State	Sub Region	Survey Unit	SSC	Mortality Total Net Volume M Ft. by SSC: Int.1/4"	Scribner	Cubic	Survey Unit: Int.1/4"	Scribner	Cubic
02	x	xx	xx	8x's*	8x's*	8x's*			
			etc	etc	etc	etc	8x's*	8x's*	8x's*
		xx	etc	etc	etc	etc	etc	etc	etc
		etc	etc	etc	etc	etc	etc	etc	etc

9.1(11) F. S. Table 32 - Net volume of mortality of sawtimber and growing stock on commercial forest land by survey unit, timber management block, and kind of volume.

The Area/Volume Deck No. 03 (LT 0 and 1; KV 1, 2, and 3) for a subregion will be sorted by block, survey unit, and kind of volume; and minor, intermediate, major, and final totals of the mortality volume will be accumulated.

The form of FS Table 32 is:

State	Sub Region	Kind Vol.	Survey Unit	Block	Block	Survey Unit	Kind Vol	Mortality Total Net Volume M Ft. by Subregion: Int. 1/4"	Scribner	Cubic
02	x	x	xx	xx	8x's*					
				etc	etc	8x's*				
			xx	etc	etc	etc				
			etc	etc	etc	etc	8x's*			
		x	etc	etc	etc	etc	etc			
		etc	etc	etc	etc	etc	etc			
								8x's*	8x's*	8x's*

9.1(12) F. S. Table 33 - Net volume of mortality of sawtimber and growing stock on commercial forest land by subregion, kind of volume, species, and diameter group.

The Volume Stratum Species and Diameter Volume Deck No. 17 (MC 7; KV 1, 2, and 3) will be sorted by species and kind of volume; and minor totals of the diameter group and species volumes will be accumulated.

The form of FS Table 33 is:

State	Sub Region	MC	KV	SG	Species	Diameter Group Total Net Volumes, M Ft. Gr 1	Gr 2	Gr 3	Gr 4	Gr 5	All
02	x	7	x	x	xx	6x's*	8x's*	8x's*	8x's*	8x's*	8x's*
					etc	etc	etc	etc	etc	etc	etc
				x	etc	etc	etc	etc	etc	etc	etc
			x	etc	etc	etc	etc	etc	etc	etc	etc
			etc	etc	etc	etc	etc	etc	etc	etc	etc

9.2 Other Tables. The listings and summary tabulations prepared as a part of compiling the survey unit volume are described and illustrated below. These summary tabulations will be prepared, as required, as a part of compiling the mortality volume at the subregion level.

9.2(1) Volume Table A - Listing of Location Control Deck No. 10.

This table is referred to in section 5.1 and it will be prepared if requested by the ARC.

The Location Control Deck No. 10 will be sorted by location/plot number, land type, and block; all data in each card will be listed; and minor, intermediate, and final totals of the number of plots will be accumulated.

The form of Volume Table A is:

St	SR	SU	Block	Land Type	Loc/Plot No.	Stratum T	SSC	SC	Major Type	Site	Stand Age	Stand Ht.	No of Plots for Land Type	Block	SU
02	x	xx	xx	x	xxxxx	xx	x	xx	xx	xx	xxx	xxx			
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc			
End of listing for all plots in a local type													4x's*		
End of listing for all plots in a block														4x's*	
End of listing for all plots in the survey unit															4x's*

9.2(2) Volume Table B - Listing of Tree Work Deck No. 21.

This table is referred to in section 5.24 and it will be prepared if requested by the ARC.

(1) All Trees The Tree Work Deck No. 21 will be sorted by tree number, merchantability class, location/plot number, land type, and block; the data in each card will be listed;

and intermediate, major, and final totals of the number of merchantable trees and their cubic foot and Scribner Dec C gross volumes will be accumulated.

The form of Volume Table B (1) is:

St	SR	SU	Bl	LT	Loc/ Plot No	Merch Class	Tree No.	Spe-cies	2" DBH	10" DBH	Log Ht	Fac-tor	1/10" CD	DBH	Diam Gr. 0-5	Diam Gr. 0-10	DBT	Sam-ple Tree	Tree Gross Vols Cu.ft. (1 dec)	Tree Gross Vols Scrib. Dec C
02	x	xx	xx	x	xxxxx	x	xx	x	xx	xx	x	xx	xx	x	xxx	xxx	xxx	xxx	x xxxxx	xxxx

The data in each card will be listed as indicated above. In addition, totals will be accumulated and printed as indicated below.

	Plot Totals			Block Totals			Survey Unit Total		
	No Merch Trees	Gross Volume Merch Trees Cubic	Gross Volume Merch Trees Scrib Dec C	No. Merch Trees	Gross Vol. Merch Trees Cubic	Gross Vol. Merch Trees Scrib Dec C	No Merch Trees	Gross Volume Merch Trees Cubic	Gross Volume Merch Trees Scrib Dec C
End of listing for all trees of a Plot	2x's*	6x's*	6x's*						
End of listing for all trees of a Block				4x's*	8x's*	8x's*			
End of listing for all trees of a Survey/Unit							6x's*	8x's*	8x's*

(2) Quality Sample Trees. The Tree work Deck No. 21 will be sorted to select the quality sample trees, sample tree codes 1 and 2; the selected cards will be sorted by sample tree code, tree number, location/plot number, land type, and block; the data in each card will be listed; and intermediate, major, and final totals of the number of trees with sample tree code 1 and their cubic foot and Scribner Dec C gross volumes will be accumulated.

The form of Volume Table B (2) is:

ST	SR	SU	Bl	LT	Loc/ Plot No.	Tree No.	Spe-cies	2" DBH	Log Ht	Sam-ple Tree	Log Grade/Merch. Factor by Position 1 Gr	1 MF	2 Gr	2 MF	3 Gr	3 MF	4 Gr	4 MF	5 Gr	5 MF	Tree Gross Volumes Cu ft (1 dec)	Tree Gross Volumes Scrib Dec C
02	x	xx	xx	x	xxxxx	xx	xx	xx	xx	x	x	xxx	x	xxx	x	xxx	x	xxx	x	xxx	xxxxx	xxxx
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc

The data in each card will be listed as indicated above. In addition, totals will be accumulated and printed as indicated below.

	Plot Totals			Block Totals			Survey Unit Totals		
		Volume			Volume			Volume	
	No. Trees	Cubic	Scrib Dec C	No. Trees	Cubic	Scrib Dec C	No. Trees	Cubic	Scrib Dec C
End of listing for all trees of a Plot	2x's*	6x's*	6x's*						
End of listing for all trees of a Block				4x's*	8x's*	8x's*			
End of listing for all trees of a Survey Unit							6x's*	8x's*	8x's*

9.2(3) Volume Table C - Proof of net volumes calculation for the merchantable ST trees of the indicator species, _____ Survey Unit, _____ Subregion.

This table is prepared in section 5.321. The merged merchantability Factor Master Deck No. 64 and the Tree Volume Deck No. 11 for the merchantable ST trees of the indicator species will be tabulated to accumulate minor totals of the tree cubic foot gross and net volumes, the Scribner Dec C gross volume, and the Scribner b.f. woods gross volume.

The form of Volume Table C is:

St	Merch Class	Species Group	Species	2" DBH Class	Merch Code	Merch Factor (2 Dec) CF	Merch Factor (2 Dec) BF	Sum of Tree Volumes Cu ft (1 Dec) Gross	Cu ft (1 Dec) Net	Scribner Dec C Gross	Scribner BF Woods Gross
02	x	x	xx	xx	xx	xx	xx	8x's*	8x's*	8x's*	8x's*
					xx	xx	xx	etc	etc	etc	etc
					etc	etc	etc	etc	etc	etc	etc
				xx	etc	etc	etc	etc	etc	etc	etc
				etc	etc	etc	etc	etc	etc	etc	etc
			xx	etc	etc	etc	etc	etc	etc	etc	etc
			etc	etc	etc	etc	etc	etc	etc	etc	etc

The Calculation of the net and woods gross volumes will be proved by multiplying the gross volumes by the merchantability factors. The results must equal the net or woods gross volumes.

9.2(4) Volume Table D-Proof of net volume calculation for all other trees.

This table is prepared in section 5.322.

The Tree Volume Deck No. 11 for all other trees (except merchantable ST indicator trees) will be sorted by merchantability factor and merchantability class; and minor totals of the tree cubic foot gross and net volumes, the Scribner Dec. C Gross volume, and the Scribner b.f. woods gross volume will be accumulated.

The form of Volume Table D is:

State	Sub Region	Survey Unit	Merch Class	Merch Factor (2 Dec)	Sum of Tree Volumes: Cu ft (1 Dec) Gross	Sum of Tree Volumes: Cu ft (1 Dec) Net	Sum of Tree Volumes: Scribner Dec C Gross	Sum of Tree Volumes: Scribner Woods Gross BF
02	x	xx	x	xx	8x's*	8x's*	8x's*	8x's*
				etc	etc	etc	etc	etc
			x	etc	etc	etc	etc	etc
			etc	etc	etc	etc	etc	etc

The calculation of the net and woods gross volumes will be proved by multiplying the gross volumes by the merchantability factor. The result must equal the net or woods gross volume.

9.2(5) Volume Table E - Tabulation of Tree Volume Deck No. 11 for summary punching the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12.

This table is prepared in section 6.1.

The Tree Volume Deck No. 11 for each merchantability class will be sorted by 10" DBH group, species, stand size class and land type; minor totals of the controls, and the tree cubic foot net and Scribner woods gross volumes will be accumulated and summary punched; and final totals of the controls, number of minor control breaks, and tree volumes will be accumulated.

The form of Volume Table E is:

St	SR	Sub unit 1/	Merch Class	LT	SSC	SG	Species	10" DBH Class	Minor Totals of: Cubic Net Vol (1 dec)	Minor Totals of: Scribner BF Gross Vol	Final Totals of: Controls	Final Totals of: Minor Control Breaks	Final Totals of: Volume Cubic	Final Totals of: Volume Scribner
02	x	xx	x	x	x	x	xx	x	6x's*	6x's*				
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc				
											6x's*	4x's*	6x's*	6x's*

After the above tabulation for each merchantability class, the summary punched Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 will be tabulated and final totals will be printed as follows:

State	Sub Region	Survey Unit 1/	Merch Class	Controls	Final totals of: No. of Cards	Final totals of: Volumes Cubic(1 Dec)	Final totals of: Volumes Scribner BF
02	x	xx	x	6x's*	4x's*	6x's*	6x's*

9.2(6) Volume Table F - Tabulation of Location Control Deck No. 10 for summary punching the Volume Stratum Average Volume per Acre Calculation Master Deck No. 65.

This table is prepared in section 6.21.

The Location Control Deck No. 10 will be sorted by stand size class and land type; minor totals of the controls and number of plots will be accumulated and summary punched; and final totals of the controls, number of minor control breaks, and number of plots will be accumulated.

The form of Volume Table F is:

State	Sub Region	Survey Unit 1/	Volume Stratum LT	Volume Stratum SSC	No. of Plots by Volume Stratum	Final Totals of: Controls	Final Totals of: No. of Minor Control Breaks	Final Totals of: No. of Plots
02	x	xx	x	x	3x's*			
etc	etc	etc	etc	etc	etc			
						2x's*	4x's*	4x's*

1/ Not included as a control item for the mortality MC.

The summary punched Volume Stratum Average Volume per Acre Calculation Master Deck No. 65 will be tabulated and final totals will be printed after the above tabulation, as follows:

State	Sub Region	Survey Unit 1/	MC	10" DBH Group	Final Totals of Controls	No. of Cards	No. of Plots
02	x	xx	1	1	2x's*	4x's*	4x's*

9.2(7) Volume Table G-Listing of the Volume Stratum Average Volume per Acre Calculation Master Deck No. 65.

This table is prepared in section 6.22.

The Volume Stratum Average Volume per Acre Calculation Master Deck No. 65 will be sorted by 10" DBH group, stand size class, and land type; all data in each card will be listed; and minor and final totals of the number of cards will be accumulated.

The form of Volume Table G is:

St	SR	SU 1/	MC	Volume Volume Stratum LT	SSC	10" DBH Group	Conversion Factor (5 Dec)	Total Acres Sampled (3 Dec)	No. Plots Sampled	Ind. Plot Size (3 Dec)	No of Cards by Volume Stratum	SU or SR
02	x	xx	1	x	x	x	8x's*	6x's*	3x's*	3x's*		
						etc	etc	etc	etc	etc	2x's*	
				x	x	etc	etc	etc	etc	etc	etc	
				etc	etc	etc	etc	etc	etc	etc	etc	
												4x's*

9.2(8) Volume Table H-Proof of Calculation of average volumes per acre by 10" DBH group.

This table is prepared in section 6.23.

The merged Volume Stratum Average Volume per Acre Calculation Master Deck No. 65 and the Volume Stratum 10" DBH Group net Volume per Acre Summary Deck No. 12 will be tabulated to accumulate minor totals of the stratum cubic foot net and Scribner b.f. woods gross volumes, and the stratum cubic foot net and Scribner b.f. woods gross average volumes per acre.

1/ Not included as a control item for the mortality MC.

The form of Volume Table H is:

St	SR	SU[1]	Volume Stratum LT	SSC	10" DBH Group	Conversion Factor (5 dec)	10" DBH Group totals of Volume Cubic Foot Net Total (1 dec)	Avg/Acre (2 dec)	Scribner b.f. Woods gross Total	Avg/Ac (2 dec)
02	x	xx	x	x	x	8x's*	8x's*	8x's*	8x's*	8x's*
					etc	etc	etc	etc	etc	etc
			x	x	etc	etc	etc	etc	etc	etc
			etc	etc	etc	etc	etc	etc	etc	etc

The Calculation of the average per acre values will be proved for each 10" DBH group by multiplying the total values by the conversion factor. The results must equal the average per acre values.

9.2(9) Volume Table I-Proof of Calculation of Scribner b.f. average net volume per acre.

This table is prepared in section 6.24.

The merged Breakage Factor Master Deck No. 70 and the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 for MC 1, 7, and 8 will be tabulated to accumulate minor totals of the Scribner b.f. woods gross and net average volumes per acre.

The form of Volume Table I is:

State	Sub Region	Survey Unit[1]	Merch Class	Land Type	Species	Breakage Factor (2 dec)	Sum of Average Volumes per Acre by Species 2 dec Scribner b.f. Woods Gross	Scribner b.f. Net
02	x	xx	x	x	xx	xxx	10x's*	10x's*
					etc	etc	etc	etc
				x	etc	etc	etc	etc
			x	etc	etc	etc	etc	etc
			etc	etc	etc	etc	etc	etc

The calculation of the net volume will be proved for each species by multiplying the woods gross volume by the breakage factor. The result must equal the net volume.

1/ Not included as a control item for the mortality MC.

9.2(10) Volume Table J - Proof of calculation of International 1/4" b.f. average net volume per acre, _____ Survey Unit, _____ Subregion.

This table is prepared in section 6.25.

The merged Scribner to International 1/4" Ratio Master Deck No. 66 and the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 for MC 1, 7, and 8 will be tabulated to accumulate minor and intermediate totals of the Scribner b.f. net and International b.f. net average volumes per acre.

The form of Volume Table J is:

State	Species Group	Species	10" DBH Group	Ratio (2 dec)	Sum of Average Net Volumes per Acre by (2 dec) 10" DBH Group: Scrib.	Int. 1/4"	Species: Scrib.	Int. 1/4"
02	x	xx	x	xxx	10x's*	10x's*		
			etc	etc	etc	etc	10x's*	10x's*
		xx	etc	etc	etc	etc	etc	etc
		etc	etc	etc	etc	etc	etc	etc
	x	etc	etc	etc	etc	etc	etc	etc

The calculation of the Int. 1/4" b.f. volume will be proved for each 10" DBH group (or species, if the ratio is the same for all 10" DBH groups of the species) by multiplying the Scribner volume by the ratio. The result must equal the Int. 1/4" volume.

9.2(11) Volume Table K - Total Average net volumes per acre by merchantability class and volume stratum.

This table is prepared in section 6.31.

The Volume Stratum 10" DBH Group net Volume per acre Summary Deck No. 12 for each merchantability class will be sorted by stand size class and land type; and minor and final totals of the cubic foot,1/ Int. 1/4" b.f.,2/ and Scribner b.f.,2/ average net volumes per acre will be accumulated.

1/ Cubic foot volume is present for all MC.
2/ Int. 1/4" b.f. and Scribner b.f. volumes are present only for MC 1, 7, and 8.

The form of Volume Table K is:

						Sum of Average Net Volumes per Acre by (2 dec)					
						Volume Stratum			Merch Class		
				Volume:		Int.	Scrib-		Int.		
		3/	Merch:	Stratum:		1/	1/4"	ner b.f.:	1/	1/4"	Scribner
St:	SR:	SU	Class:	LT:	SSC:	Cu ft:	b.f. 2/	2/	Cu ft:	b.f. 2/	b.f. 2/
02	x	xx	x	x	x	8x's*	8x's*	8x's*			
				etc	etc	etc	etc	etc			
									10x's*	10x's*	10x's*

9.2(12) Volume Table L - Listing of Volume Stratum Average Volume per Acre Master Deck No. 67.

This table is prepared in section 6.32.

The Volume Stratum Average net Volume per Acre Master Deck No. 67 will be sorted by stand size class, land type, and kind of volume; all data punched in each card will be listed; and final totals of the merchantability class average volumes per acre will be accumulated. Separate runs will be made for each kind of volume.

The form of Volume Table L is:

						Average net Volumes per Acre, ft (0 dec)				
			Kind	Volume						
		4/	of	Stratum	Merch-	5/	5/	6/		Salv.
State:	SR:	SU:	Volume:	LT:	SSC:	antable:	So. Cull:	Ro. Cull:	Mortality:	Dead
02	x	xx	x	x	x	5x's*	5x's*	5x's*	5x's*	5x's*
				etc	etc	etc	etc	etc	etc	etc
Final Totals						8x's*	8x's*	8x's*	8x's*	8x's*

9.2(13) Volume Table M - Proof of total net volume calculation.

This table is prepared in section 7.2.

The merged Volume Stratum Average Net Volume per Acre Master Deck No. 67 and the Area/Volume Deck No. 03 will be tabulated to accumulate minor totals of the acres and the merchantability class

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1/ Cubic foot volume is present for all MC.
2/ Int. 1/4" b.f. and Scribner b.f. volumes are present only for MC 1, 7, and 8.
3/ Not included as a control item for MC 7.
4/ Not included as a control item in the Deck for the mortality MC.
5/ No board foot volumes for MC 2 and 3.
6/ Mortality volume not in survey unit Decks.

total volumes. The mortality volume will be accumulated in a separate run for each subregion.

The form of Volume Table M is:

						Avg. Net Volms.per Ac				Totals Net Volms. M ft.			
						Mer-				Mer-			
						chant-				chant-			
				Volume		able	2/	2/		able	2/	2/	
		1/	Kind	Stratum		or Mor-	So	Ro	Salv	Total or Mor-	So	Ro	Salv.
St	SR	SU	Vol	LT	SSC	tality	Cull	Cull	Dead	Acres tality	Cull	Cull	Dead
02	x	xx	x	x	x	5x's*	5x's*	5x's*	5x's*	8x's* 10x's*	8x's*	8x's*	8x's*
				etc	etc	etc	etc	etc	etc	etc etc	etc	etc	etc
			x	etc	etc	etc	etc	etc	etc	etc etc	etc	etc	etc
			etc	etc	etc	etc	etc	etc	etc	etc etc	etc	etc	etc

The calculation of the total net volumes will be proved for each volume stratum by multiplying the acres by the average net volumes per Acre. The results must equal the total net volumes.

9.2(14) Volume Table N - Tabulation of the Area/Volume Deck No. 03 for summary punching the Volume Stratum Total Volume Master Deck No. 15.

This table is prepared in section 7.3.

The Area/Volume Deck No. 03 for each kind of volume will be sorted by stand size class and land type; and tabulated twice. On the first run, minor totals of the controls and merchantability class total volumes (except mortality) will be accumulated and summary punched; and final totals of the controls, number of minor control breaks, and total merchantable (or mortality) volume will be accumulated. The first run will be repeated for mortality volume only at the subregion level. On the second run, final totals of the sound cull, rotten cull, and salvable dead total volumes will be accumulated. The second run will not be repeated for the mortality volume.

1/ Not included as a control item for the mortality MC.
2/ No board foot volumes for MC 2 and 3.

The form of Volume Table N is:

First Run:

St	SR	SU	Gr.	KV	LT	SSC	Volume Stratum Total Net Volumes, M ft. Merchantable (or Mortality)	So Cull 2/	Ro Cull 2/	Salv Dead	Final Totals of Controls	Minor Breaks	Merchantable (or Mortality) Volume
02	x	x	x	x	x	x	8x's*	8x's*	8x's*	8x's*			
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc			
											2x's*	4x's*	8x's*

1/ Not included as a control item for the mortality MC.
2/ No board foot volumes for MC 2 and 3.

Second Run:

State	Sub Region	Survey Unit	Spec Gr	KV	Final Totals of Volume for Sound Cull 1/	Rotten Cull 1/	Salv Dead
02	x	xx	x	x	8x's*	8x's*	8x's*

1/ No board foot volumes for MC 2 and 3.

The summary punched Volume Stratum Total Volume Master Deck No. 15 will be tabulated at the end of the above runs and final totals printed as follows:

St	SR	SU	Spec Gr	KV	Controls	No. of Cards	Final Totals of Volume: Merchantable (or Mortality)	So Cull 2/	Ro Cull 2/	Salv. Dead
02	x	xx	x	x	2x's*	4x's*	8x's*	8x's*	8x's*	8x's*

1/ Not included as a control item for the mortality MC.
2/ No board foot volumes for MC 2 and 3.

9.2(15) Volume Table O - Tabulation of the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 for summary punching the Volume Stratum Total Average Net Volume per Acre Master Work Deck No. 13.

This table is prepared in sections 8.11 and 8.111.

The Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 for each merchantability class will be sorted by 10" DBH group, species, stand size class, and land type; minor totals of the controls and average net volumes per Acre by kind of volume will be accumulated and summary punched; and final totals of the controls, number of minor control breaks, and average net volumes per acre by kind of volume will be accumulated.

The form of Volume Table O is:

						Avg Net Vol/AC by Vol Strat. 2 Dec			Final Totals			
		1/							No of Minor Con- trol	Avg Net Vol/AC		
St	SR	SU	MC	Spec Gr	Vol Strat	Cubic	2/ 1/4" Int	2/ Scrib	Con- trols	Breaks	Cubic	2/ 1/4" Int.	2/ Scrib
02	x	xx	x	x	xx	8x's*	8x's*	8x's*					
etc	etc	etc	etc	etc	etc	etc	etc	etc					
									2x's*	4x's*	8x's*	8x's*	8x's*

1/ Not included as a control item for the mortality MC.
2/ No board foot volumes for MC 2 and 3.

The summary punched Volume Stratum Total Average Net Volume per Acre Master Work Deck No. 13 will be tabulated at the end of the above run and final totals printed as follows:

					Final Totals				
							Average Net Volumes/Acre		
	Sub	1/ Survey	Merch	Spec		No of	2/	2/	
State	Region	Unit	Class	Gr	Controls	Cards	Cubic	Int.1/4"	Scribner
02	x	xx	x	x	2x's*	4x's*	8x's*	8x's*	8x's*

1/ Not included as a control item for the mortality MC.
2/ No board foot volumes for MC 2 and 3.

9.2(16) Volume Table P - Tabulation of the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 for Summary punching the Volume Stratum Species and Diameter Group Total Average Net Volume per Acre and Percent Calculation Deck No. 14X1, KV_____.

This table is prepared in sections 8.11 and 8.112. Separate runs will be made for each kind of volume of each merchantability class.

The Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 for each merchantability class will be sorted by 10" DBH group, species, stand size class, and land type; and tabulated twice.

On the first run for each KV/MC, minor totals of the controls, the species total average net volume per acre, and the diameter group total average net volumes per Acre for groups 1, 2, 3, 4, and 5 will be accumulated and summary punched; and final totals of the number of minor control breaks will be accumulated.

On the second run for each KV/MC, final totals of the controls, number of minor control breaks, species total average net volume per acre, and diameter group total average net volumes per acre for groups 1, 2, 3, 4, and 5 will be accumulated.

The form of Volume Table P is:

First run:

													Final
													Total
													No.of
								Minor Totals of Total Average Net					Minor
			Spe-					Volumes per Acre					Con-
		1/	cies			Spe-	Spe-	Diameter Groups					trol
St:	SR:	SU:	MC:	group:	VS:	cies:	cies:	Gr 1 :	Gr 2 :	Gr 3 :	Gr 4 :	Gr 5:	Breaks
02	x	xx	x	x	xx	xx	8x's*	6x's*	8x's*	8x's*	8x's*	8x's*	
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	
													4x's*

1/ Not included as a control item for the mortality MC.

Second run:

				Final Totals								
				No.of								
				Minor		Total Average Net Volumes Per Acre						
		1/	Con-	Control			Diameter Groups					
State:	SR:	SU:	MC:	trols:	Breaks	Species:	Gr 1 :	Gr 2 :	Gr 3 :	Gr 4 :	Gr 5	
02	x	xx	x	4x's*	4x's*	8x's*	6x's*	8x's*	8x's*	8x's*	8x's*	

1/ Not included as a control item for the mortality MC.

The summary punched Volume Stratum Species and Diameter Group Total Average Net Volume per Acre and Percent Calculation Deck No. 14 X1 will be tabulated at the end of the above runs and final totals printed as follows:

State	SR	SU 1/	MC	KV	Controls	No. of Cards	Species	Final Totals: Total Average Net Volumes: Diameter Groups Gr 1	Gr 2	Gr 3	Gr 4	Gr 5
02	x	xx	x	x	4x's*	4x's*	8x's*	6x's*	8x's*	8x's*	8x's*	8x's*

1/ Not included as a control item for the mortality MC.

9.2(17) Volume Table Q - Proof of Calculation of species and diameter group percents.

This table is prepared in section 8.122.

The Volume Stratum Species and Diameter Group Total Average Net Volume per Acre and Percent Calculation Deck No. 14NX1 for each kind of volume of each merchantability class will be sorted by species and volume stratum; minor totals of the number of cards, the species percents, and the diameter group percents will be accumulated; and the final total of the number of cards will be accumulated.

The form of the Volume Table Q is:

St	SR	SU 1/	MC	KV	Vol Strat	No of Cards	Species percents	Volume Stratum Totals of: Diameter Group Percents Gr 1	Gr 2	Gr 3	Gr 4	Gr 5	Final Total No of Cards
02	x	xx	x	x	xx	4x's*	8x's*	8x's*	8x's*	8x's*	8x's*	8x's*	
					etc	etc	etc	etc	etc	etc	etc	etc	
													4x's*

1/ Not included as a control item for the mortality MC.

The Calculation of the species percents of the stratum volume will be correct if the species percents total to 1.000 for each volume stratum.

The Calculation of the diameter group percents will be correct for each volume stratum if the sum of the five diameter group percents equals 1.000 times the number of cards for each volume stratum.

9.2(18) Volume Table R - Listing of the Volume Stratum Species and Diameter Percent Deck No. 16 and proof of species total volume calculation.

This table is prepared in section 8.21.

The Volume Stratum Species and Diameter Percent Deck No. 16 for each kind of volume of each merchantability class will be sorted by species and volume stratum; the data in each card will be listed; and minor and final totals of species volume and number of cards will be accumulated.

The form of Volume Table R is:

St	SR	SU 1/	MC	Kind Vol	Vol Strat	Spec Gr	Species	Species Percent of Stratum Volume (4 dec)	Diameter Group Percents of Species Volume (4 dec) Gr 1	Gr 2	Gr 3	Gr 4	Gr 5	Species Total Vol M ft
02	x	xx	x	x	xx	x	xx	5x's*	5x's*	5x's*	5x's*	5x's	5x's	7x's
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc

1/ Not included as a control item for the mortality MC.

In addition to the data listed for each card, minor and final totals will be printed as indicated below.

	Volume Strat Totals		Survey Unit Totals 1/	
	Species Volume	No. Cards	Species Volume	No. Cards
End of listing for all cards of a volume stratum	8x's*	4x's*		
End of listing for all cards of a survey unit 1/			8x's*	4x's*

1/ Subregion for the mortality MC.

The Calculation of the volume stratum species volume will be proved by balancing the volume stratum totals of the species volume in this table with those in Volume Table N, section 9.2(14). The two sets of totals must be the same.

9.2(19) Volume Table S - Listing of the Volume Stratum Species and Diameter Volume Deck No. 17 and proof of diameter group total volume Calculations.

This table is prepared in section 8.22.

The Volume Stratum Species and Diameter/Deck No. 17 for each kind of volume of each merchantability class will be sorted by species and volume stratum; the data in each card will be listed; and final totals of the species volume, the diameter group volumes, and the number of cards will be accumulated.

The form of Volume Table S is:

St	SR	SU	MC	Kind Vol	Vol Strat	Spec. Gr	Species	Species Total Volumes M Ft.	Diameter Groups Total Volumes M Ft Gr 1	Gr 2	Gr 3	Gr 4	Gr 5	No of Cards
	1/													
02	x	xx	x	x	xx	x	xx	7x's	5x's	6x's	6x's	6x's	6x's	
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	
Final Totals at end of listing for all cards of a survey unit 2/								8x's*	8x's*	8x's*	8x's*	8x's*	8x's*	4x's*

1/ Not included as a control item for the mortality MC.
2/ Subregion for the mortality MC.

The Calculation of the diameter group volumes will be proved by summing their final totals and balancing this sum with the final total of the species volume. The two totals must be the same.

9.2(20) Volume Table T - Sum of merchantable sawtimber tree Scribner Board foot net and woods gross average volumes per acre by species.

This table is prepared for the use of the ARC as described in section 8.23.

The Volume Stratum 10" DBH Group Net Volume Summary Deck No. 12 for merchantable sawtimber trees (MC 1, 10" DBH 2,3,4 and 5) will be sorted by species; and minor, intermediate, and final totals of the Scribner b.f. net and woods gross average volumes per acre will be accumulated.

The form of Volume Table T is:

						Sum of Scribner BF Average Volumes per Acre (2 dec)					
					Spe-	Species		Species Group		Survey Unit	
St	SR	SU	MC	SG	cies	Net	Woods gross	Net	Woods Gross	Net	Woods Gross
02	x	xx	1	x	xx	8x's*	8x's*				
					etc	etc	etc	8x's*	8x's*		
				x	etc	etc	etc	etc	etc		
										8x's*	8x's*

9.2(21) Volume Table V - Sum of merchantable sawtimber tree Scribner b.f. woods gross and gross tree basis volumes by species.

This table is prepared for the use of the ARC as described in section 8.23.

The Tree Volume Deck No. 11 for merchantable sawtimber trees (MC 1, 10" DBH 2,3,4, and 5) will be sorted by species; and minor, intermediate, and final totals of the Scribner b.f. woods gross and Scribner Dec. C gross tree volumes will be accumulated.

The form of Volume Table V is:

						Sum of Tree Volumes, Scribner					
						Species		Species Group		Survey Unit	
						Woods:		Woods:		Woods:	
State	Sub Region	Survey Unit	MC	SG	Spec-ies	Gross B.F.	Gross Dec C	Gross B.F.	Gross Dec C	Gross B.F.	Gross Dec C
02	x	xx	1	x	xx	8x's*	8x's*				
					etc	etc	etc	8x's*	8x's*		
				x	etc	etc	etc	etc	etc		
										8x's*	8x's*

9.2(22) Volume Table V - Proof of calculation of sawlog, upper stem and hardwood limbwood cubic volumes.

This table is prepared in section 8.3.

The Species and Diameter Group Total Cubic, Sawlog Cubic, and Upper Stem Cubic Volume Deck No. 23 will be sorted by 10" DBH group, species, and volume stratum; and final totals of the total cubic, sawlog cubic, upper stem cubic, and hardwood limbwood cubic volumes will be accumulated by species group.

The form of Volume Table V is:

					Cubic Volume Totals M Ft							
					Softwoods			Hardwoods				
St	SR	SU	MC	KV	Total	Sawlog	Upper stem	Total	Sawlog	Upper Stem	Limbwood
02	x	xx	x	x	8x's*	8x's*	8x's*	8x's*	8x's*	8x's*	8x's*

The calculation of the softwood and hardwood sawlog and upper stem cubic volumes will be proved by summing their totals and balancing this sum with the total cubic volume. The two totals must be the same. The calculation of the hardwood limbwood volume will be proved by multiplying the hardwood sawlog cubic volume by the limbwood factor. The result must equal the limbwood total volume.

9.2(23) Volume Table W - Tabulation of the Area/Volume Deck No. 03 for Summary Punching the Block Volume Stratum Total Volume Master Deck No. 15X1.

This table is prepared in section 8.41.

The Area/Volume Deck No. 03 for KV 2 will be sorted by volume stratum (LT/SSC stratum) and block; minor totals of the controls and the merchantable total net volume will be accumulated and summary punched; and final totals of the controls, number of minor control breaks, and merchantable total net volume will be accumulated.

The form of Volume Table W is:

									Final Totals of		
								Volume Stratum Merchantable Total Net Volume, M Ft Scribner			
St	SR	SU	Block	KV	Spec. Gr	Vol Strat LT	Vol Strat SSC		Controls	No of Minor Control Breaks	Merch Tot. Net Volume
02	x	xx	xx	2	x	x	x	8x's*			
etc	etc	etc	etc	etc	etc	etc	etc	etc	4x's*	4x's*	8x's*

The summary punched Block Volume Stratum Total Volume Master Deck No. 15X1 will be tabulated at the end of the above run and final totals printed as follows:

State	Sub Region	Survey Unit	MC	KV	Spec Gr	Final Totals of Controls	No of Cards	Merch Tot Net Volume
02	x	xx	1	2	x	4x's*	4x's*	8x's*

9.2(24) Volume Table X - Proof of species total volume calculation for the Block Species and Diameter Percent Deck No. 16X1.

This table is prepared in section 8.42.

The Block Volume Stratum Species and Diameter Percent Deck No. 16X1 will be sorted by volume stratum and block; and minor, intermediate, and final totals of the species total net volumes will be accumulated.

The form of Volume Table X is:

St	SR	SU	Block	MC	KV	Vol Strat	Species Total net volume, M ft Scribner by Volume Stratum	Block	Survey Unit
02	x	xx	xx	1	2	xx	8x's*		
						etc	etc	8x's*	
			xx	1	2	etc	etc	etc	
									8x's*

The calculation of the species volumes will be proved for each volume stratum by balancing the totals in this table with those of Volume Table W, section 9.2(23); or for each survey Unit by balancing the totals with those of Volume Table R section 9.2(18). The sets of totals must be the same.

10. VOLUME ERROR DATA COMPILATION

The basic data for the volume sample error calculations are available in the IBM cards. The volume data will be compiled for sample error calculations for each volume stratum of a survey unit for merchantable volume, or of a subregion for mortality volume. The cubic foot net volumes of merchantable and mortality trees on the 3/5 acre locations will be utilized for this compilation. The total area of commercial forest land and the growing stock total net volume and the total mortality volume also will be summarized. The compilation of these data for the volume error analysis is described in this section. The calculation and analysis of the volume sample error will be done by the ARC.

10.1 Preparation of Data. The basic merchantable and mortality volume data for the 3/5 acre field locations will be summarized at the same time. These data will be obtained from the Tree Volume Deck No. 11 prepared in section 5.3.

10.11 Location Mortality Volume Error Summary Deck No. 29. The Tree Volume Deck No. 11 will be sorted to select the cards for merchantable and mortality trees, and for no live merchantable trees on the plot (MC codes 1, 7, and 9). The code 9 cards will be sorted on column 75 to select the cards with an X punch. The MC code 9 cards with an X75 will not be used.

The cards of Deck No. 11 for MC 1, 7, and 9 - NX75 will be combined and sorted by location/plot number to place all of the cards for a 3/5 acre field location together in a control group. The Tree Volume Deck No. 11 will be tabulated; the tree cubic foot net volume, poletimber separate from sawtimber, will be accumulated by merchantable and mortality trees; and the merchantable tree Scribner b.f. woods gross volume will be accumulated. These volumes will be accumulated for each field location. This summary tabulation is described in section 10.311.

As the Tree Volume Deck No. 11 is tabulated, the Location Mortality Volume Error Summary Deck No. 29, described in section 16.1(12), will be summary punched. One card No. 29 will be punched automatically for each control group (3/5 acre field location) of Deck No. 11. Each card No. 29 will contain the items: state, subregion, survey unit, block location number, land type, stand size class, the merchantable cubic foot net volume of PT and of ST, the merchantable Scribner b.f. woods gross volume, and the mortality cubic foot net volume of PT and of ST.

The Location Mortality Volume Error Summary Deck No. 29 will be used to prepare the Location Merchantable Volume Error Summary Deck No. 20 as described in section 10.12, in the mortality volume calculations as described in section 10.22, and to prepare the mortality volume error summary tabulations as described in section 10.32

10.12 Location Merchantable Volume Error Summary Deck No. 20. The Location Merchantable Volume Error Summary Deck No. 20, described in section 16.1(9), will be reproduced from the Location Mortality Volume Error Summary Deck No. 29. One card No. 20 will be prepared for each card No. 29. Each Card No. 20 will contain the items: state, subregion, survey unit, block, location number, land type, stand size class, and the location merchantable total volumes - cubic foot net for PT and for ST, and Scribner b.f. woods gross for ST.

The Location Merchantable Volume Error Summary Deck No. 20 will be used in the merchantable volume calculations described in section 10.21 and in the merchantable volume error summary tabulations described in section 10.31

10.2 Calculation of Data.

10.21 Merchantable Volume. The one card of the Location Volume Blow Up Master Deck No. 68, prepared in section 3.5, will be placed in front of the cards of the Location Merchantable Volume Error Summary Deck No. 20. The location poletimber blow up factor will be applied to the poletimber cubic foot net volume to raise it to the sawtimber level. The result will be added to the sawtimber cubic foot net volume and the sum will be punched into each card No. 20. The PT & ST cubic foot net volume and the ST Scribner b.f. woods gross volume will be multiplied by the location sawtimber blow up factor. The results, the location volumes on a per acre basis, will be punched into each card No. 20. These calculations will be proved on the tabulator as described in section 10.312.

The location cubic foot net and Scribner board foot woods gross volumes per acre will be squared, and the squares will be punched into each card No. 20. These calculations will be proved for each card No. 20 using the calculator.

10.22 Mortality Volume. The Location Volume Blow Up Master Card No. 68, prepared in section 3.5, will be placed before the Cards of the Location Mortality Volume Error Summary Deck No. 29. The location poletimber blow up factor will be applied to the poletimber cubic foot net volume to raise it to the sawtimber level. The result will be added to the sawtimber cubic foot net volume and the sum will be punched into each card No. 29.

The PT + ST cubic foot net volume will be multiplied by the location mortality volume blow up factor. The result, the location mortality volume on a per acre basis, will be punched into each card No. 29. These calculations will be proved on the tabulator as described in section 10.321.

The location mortality cubic foot net volume per Acre will be squared, and the squares will be punched into each card No. 29. These calculations will be proved for each card No. 29 using the Calculator.

10.3 Summarization of Data. The summary tabulations of volume error data, that will be prepared and sent to the ARC regularly, are described in this sub section. Tabulations other than those described can be prepared if desired. The requests for special volume error tabulations should include a table outline with complete headings and explanatory notes.

10.31 Merchantable Volume. The volume error data for merchantable volume will be prepared and summarized by survey unit.

10.311 Volume Error Table A - Tabulation of Tree Volume Deck No. 11 for summary punching the Location Mortality Volume Error Summary Deck No. 29.

This Table is prepared in section 10.11.

The Tree Volume Deck No. 11 for MC 1, 7, and 9NX 75 will be sorted by location/plot number; and tabulated twice. On the first run, minor totals of the controls, the merchantable cubic foot net volumes - PT separate from ST, the merchantable Scribner BF woods gross ST volume, and the mortality cubic foot net volume - PT separate from ST - will be accumulated and summary punched; and final totals of the controls and the number of minor control breaks will be accumulated. On the second run, final totals of the merchantable and mortality volumes will be accumulated.

The form of Volume Error Table A is:

First Run:

							Location Total Volumes					Final Totals	
							Merchantable			Mortality			
							Cubic Foot Net (1 dec)		Scribner BF Woods Gross	Cubic Foot Net (1 dec)		Con-trols	No. of Minor Control Breaks
St	SR	SU	Block	No	LT	SSC	PT	ST	ST	PT	ST		
02	x	xx	xx	xxxx	x	x	5x's*	6x's*	5x's*	5x's*	6x's*		
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	etc		
												8x's*	4x's*

Second Run:

			Final Totals of Volumes				
			Merchantable			Mortality	
			Cubic Foot Net (1 dec)		Scribner BF: Woods Gross	Cubic Foot Net (1 dec)	
State	Sub Region	Survey Unit	PT	ST	ST	PT	ST
02	x	xx	6x's*	6x's*	6x's*	6x's*	6x's*

The summary punched Location Mortality Volume Error Summary Deck No. 29 will be tabulated at the end of the above table and final totals will be printed as follows:

					Final Totals					
					Volumes					
					Merchantable		Scribner BF Woods Gross	Mortality		
					Cubic Foot - Net (1 dec)			Cubic Foot Net(1 Dec)		
St	SR	SU	Con-trols	No of cards	PT	ST	ST	PT	ST	
02	x	xx	8x's*	4x's*	6x's*	6x's*	6x's*	6x's*	6x's*	

10.312 Volume Error Table B - Proof of Calculation of location volume per acre. This table is prepared in section 10.21.

The Location Merchantable Volume Error Deck No. 20 will be tabulated to accumulate final totals of the PT, ST, PT+ST and PT +ST per acre cubic foot net volumes; and the Scribner woods gross BF volume, and the Scribner B.F. volume per acre.

The form of Volume Error Table B is:

			Final Totals of Merchantable Volume					
			Cubic Foot Net					Scribner BF
State	Region	Sub Survey Unit	PT (1 dec)	ST (1 dec)	PT + ST (1 dec)	PT + ST per acre	ST	Woods Gross ST per acre
02	x	xx	8x's*	8x's*	8x's*	8x's*	8x's*	8x's*

The Calculation of the PT + ST Cubic foot net volume will be proved by multiplying the PT volume by the location poletimber blow up factor and adding the result to the ST volume. The sum must equal the PT + ST volume. The Calculation of the PT + ST cubic foot net volume per acre or the ST Scribner BF woods gross volume per acre will be proved by multiplying the PT + ST cubic foot or the ST Scribner BF volume by the location sawtimber blow up factor. The results must equal the per acre values.

10.313 Volume Error Table C - Number of field locations, sum of location volumes per acre, and sum of location volumes per acre squared by volume stratum.

This table will be prepared for the use of the ARC in calculating the merchantable volume sample error.

The Location Merchantable Volume Error Summary Deck No. 20 will be sorted by location number, stand size class, and land type; the data in each card will be listed; and minor totals of the number of locations, the location cubic foot net and Scribner b.f. woods gross volumes per acre, and the location volumes per acre squared will be accumulated.

The form of Volume Error Table C is:

St	Sub Region	Survey Unit	Block	Vol Strat	Loc No.	Location Merchantable Volumes: Cubic Foot Net: PT + ST per acre	PT+ST/ Ac Squared	Scribner B.F. Woods Gross: ST per acre	ST/Ac Squared	No. of Loc.
02	x	xx	xx	xx	xxxx	5x's	10x's	6x's	12x's	
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	
Volume Stratum Totals						8x's*	14x's*	8x's*	14x's*	4x's*
02	x	xx	xx	xx	xxxx	5x's	10x's	6x's	12x's	
etc	etc	etc	etc	etc	etc	etc	etc	etc	etc	
Volume Stratum Totals						8x's*	14x's*	8x's*	14x's*	4x's*
Etc for all volume strata										

10.314 Volume Error Table D - Area of commercial forest land and merchantable total net volume of growing stock by volume stratum.

This table will be prepared for the use of the ARC in calculating the merchantable volume sample error.

The Area/Volume Deck No. 03 (LT 0 and 1, KV 2 and 3) will be sorted by volume stratum and kind of volume; and minor and intermediate totals of the acres and the merchantable net volume will be accumulated.

The form of Volume Error Table D is:

St	SR	SU	Kind Vol	Vol Strat	Volume Stratum Totals: Commercial Forest Area Acres	Merchantable Net Volume M Ft.	Survey Unit Totals: Commercial Forest Area Acres	Merchantable Net Volume M Ft.
02	x	xx	x	xx	8x's*	10x's*		
				etc	etc	etc	8x's*	10x's*
			x	etc	etc	etc	etc	etc

10.32 Mortality Volume. The volume error data for mortality volume will be prepared by survey unit but it will be summarized by subregion.

10.321 Mortality Error Table A - Proof of Calculation of location mortality volume per acre.

This table is prepared in section 10.22.

The Location Mortality Volume Error Summary Deck No. 29 will be tabulated to accumulate final totals of the PT, ST, PT+ST, and PT+ST per acre cubic foot net volumes.

The form of Mortality Error Table A is:

			Final Totals of Mortality Volume - Cu Ft Net			
State	Sub Region	Survey Unit	PT (1 dec)	ST (1 dec)	PT+ST (1 dec)	PT+ST Per Acre
02	x	xx	8x's*	8x's*	8x's*	8x's*

The calculation of the PT+ST mortality volume will be proved by multiplying the PT volume by the location poletimber blow up factor and adding the result to the ST volume. The sum must equal the PT+ST volume. The calculation of the PT+ST volume per acre will be proved by multiplying the PT+ST volume by the location mortality volume blow up factor. The result must equal the PT+ST volume per acre.

10.322 Mortality Error Table B - Number of field locations, sum of location 10 year mortality volume, and sum of location 10 year mortality volume squared.

This table will be prepared for the use of the ARC in calculating the mortality volume sample error.

The Location Mortality Volume Error Summary Deck No. 29 for a subregion will be sorted by location number, survey unit, stand size class, and land type, the data in each card will be listed; and minor totals of the number of locations, the location 10 year mortality cubic foot net volume per acre, and the location 10 year mortality volume per acre squared will be accumulated.

The form of Mortality Error Table B is:

State	Sub Region	Vol. Strat	Survey Unit	Block	Loc No	Location PT+ST per acre	10 Year Mortality Volumes Cu Ft. Net PT+ST per acre	Squared	No. of Loc.
02	x	xx	xx	xx	xxxx	6x's	12x's		
			etc	etc	etc	etc	etc		
Volume Stratum Totals						8x's*	14x's*		4x's*
02	x	xx	xx	xx	xxxx	6x's	12x's		
			etc	etc	etc	etc	etc		
Volume Stratum Totals						8x's*	14x's*		4x's*
Etc for all Volume Strata									

10.323 Mortality Error Table C - Area of commercial forest land and 10 year mortality volume of growing stock by volume stratum.

This table will be prepared for the use of the ARC in calculating the mortality volume sample error.

The Area/Volume Deck No. 03 (LT 0 and 1, KV 3) for a subregion will be sorted by stand size class and land type; and minor and final totals of the acres and the mortality net volume will be accumulated.

The form of Mortality Error Table C is:

State	Sub Region	Kind Vol	Vol Strat	Vol. Strat. Totals: Commercial Forest Area Acres	Vol. Strat. Totals: Mortality Net Volume, M Ft.	Subregion Totals: Commercial Forest Area Acres	Subregion Totals: Mortality Net Volume, M Ft.
02	x	3	xx	8x's*	10x's*		
			etc	etc	etc		
						8x's*	10x's*

10.4 Other Data. The other data that can be used in the merchantable and mortality volume sample error calculations are: (1) the merchantable average net volumes per acre by volume stratum for each survey unit; and (2) the 10 year mortality average net volumes per acre by volume stratum for each subregion. These average net volumes per acre are available from the Tables of Average Volumes per Acre prepared in section 6.31 and described in section 15.27.

QUALITY

11. LOG QUALITY COMPILATION.

The volume of quality logs and the volume of the quality species will be compiled at the subregion level for Scribner board foot (KV2) volume by the IBM Service Unit. The Calculation of the percents of the volume and the total net volume by species and log grade will be done by the ARC.

11.1 The Quality Sample. The quality sample consists of the quality logs of the quality species on the quality sub plots of the odd numbered field locations. For each odd numbered field location, a 1/20 acre quality sub plot is established at each of the three sample plots (see section 4.1). On these sub plots, quality is measured for each merchantable Sitka spruce (code 42) and Western hemlock (code 48) sawtimber tree. The quality log grades for spruce are select sawmill logs (code 0) and No. 1 sawmill logs (code 1); and those for hemlock are peeler grade logs (code 6) and No. 1 logs (code 1).

The log grade code and the log merchantability factor will be determined for each quality log, or other logs that are below a quality log in log position, of quality sample trees. These items of data will be recorded on the Plot Record as described in section 4.221. The log grades and merchantability factors will be punched in the Tree Work Deck No. 21 as described in section 5.21.

11.2 Percent of Tree Volume by Log Height and Position Master Deck No. 90. The purpose of this master deck is to proportion the tree gross board foot volume to the logs of the tree. The percents of the tree gross volume are contained in the Table of Tree Gross Volume Percents by 16' Log Height and 16' Log Position, as described in section 15.51.

The Percent of Tree Volume by Log Height and Position Master Deck No. 90, described in section 16.91, will be punched and verified from the aforementioned Table of Percents. One card No. 90 will be prepared for each log position of each total height class. Each card No. 90 will contain the items: state, log height, log position, and log percent of tree gross board foot volume. The Deck No. 90 will not be listed unless this is requested by the ARC.

The Percent of Tree Volume by Log Height and Position Master Deck No. 90 will be used with the Log Volume Deck No. 40 as described in section 11.32.

11.3 Log Volume Deck No. 40

11.31 Reproduce Deck No. 40. The log quality sample data were punched in the Tree Work Deck No. 21 as described in section 5.21. The entire Deck No. 21 for merchantable trees (MC1) will be sorted on the sample tree code to select the cards with codes 1 and 2. These selected cards are for the merchantable spruce and hemlock sawtimber trees that are on the quality sample sub plots of the odd numbered field locations. The cards with code 1 will be kept separate from those with code 2.

The cards of sample tree code group 1 will be sorted on the log grade of log position 1 to select the cards coded 9. These cards are for trees with cull logs in position 1, or they are for trees that have no quality logs. The selected, code 9 in log grade position 1, cards will be sorted on the log grade of log position 2. The cards with nothing punched in this column are for the trees with no quality logs. These Tree Work Cards No. 21 for quality sample trees with no quality logs will be returned to the file and will not be used further in the quality compilation. The other selected, code 9 in log position 1, cards with something punched in the log grade position 2 column will be placed with the sample tree group 1 cards of Tree Work Deck No. 21.

Each sample tree group of the Tree Work Deck No. 21, selected as described above, will be sorted on total log height and placed in log height groups. The cards with sample tree code 1 contain the quality data for log positions 1 through 5; and the cards with sample tree code 2 contain the quality data for log positions 6 through 10 (see section 16.1(10)).

The Log Volume Deck No. 40, described in section 16.41, will be reproduced from the selected cards of the Tree Work Deck No. 21. One card No. 40 will be prepared for each quality log of each quality sample tree. The cards of Deck No. 21 will be sorted by log grade to select out those cards with a non quality log (Code 9 or reject) in the log position for which the Deck No. 40 is to be reproduced. The Code 9 selected out cards must be replaced before sorting and reproducing for the next log position; but those reject selected out cards do not need to be replaced. Each card No. 40 will contain the items: state, subregion, survey unit, block, location/plot number, land type, local type, stand size class, stocking class, major type, tree number, species group, species, 2" DBH class, 10" DBH group, log height, merchantability class, merchantability code, log position, log grade, log merchantability factor, and the tree Scribner Dec. C gross volume.

11.32 Calculate Log Gross and Net Volumes.

The Percent of Tree Volume by Log Height and Position Master Deck No. 90, prepared in section 11.2, and the Log Volume Deck No. 40 will be sorted by log position and total log height; and merged. The Scribner Dec. C gross and net volumes will be calculated for each log and punched into each card No. 40. This will be done by multiplying the tree Scribner Dec C gross volume by the log percent of tree gross volume and the resulting log gross volume by the log merchantability factor. These Calculations will be proved on the tabulator as described in sections 11.521 and 11.522.

11.33 Calculate Log Net Volume per Acre. The one card of the Location Volume Blow up Master Deck No. 68, prepared in section 5, will be placed before the cards of the Log Volume Deck No. 40. The log Scribner b.f. net volume per acre will be calculated and punched into each card No. 40 by multiplying the log Scribner Dec C net volume by the location sawtimber quality volume blow up factor. This Calculation will be proved using the tabulator as described in section 11.522.

11.34 Use of Deck No. 40. The Log Volume Deck No. 40 will be used to prepare summary tabulations of log volume as described in section 11.511, and to prepare the Location Quality Volume Error Summary Deck No. 49, as described in section 11.61.

11.4 Quality Species Tree Net Volume per Acre Calculation.

11.41 All Trees of Quality Species on Odd Numbered Field Locations. The Tree Volume Deck No. 11, prepared in section 5.3, will be sorted to select the cards for the odd numbered field locations. These selected cards will be sorted on merchantability class, species, and 10" DBH group to select the cards for the merchantable (MC1) sawtimber size (10" DBH 2,3,4, & 5) Sitka spruce - (code 42,) and western hemlock - (code 48.) trees, the quality species. An identifying X will be punched into column 69 of these selected cards.

The Location Volume Blow Up Master Card No. 68 will be placed before the cards of the Tree Volume Deck No. 11X69 for the quality species on the odd numbered field locations. The Scribner b.f. woods gross volume per acre will be calculated and punched for each card No. 11X69 by multiplying the Scribner b.f. woods gross volume by the location sawtimber volume blow up factor. This calculation will be proved using the tabulator as described in section 11.523.

11.42 Quality Sample Trees on Quality Sub Plots. The Tree Volume Deck No. 11 X 69 for the quality sample trees on the odd numbered field locations will be sorted on sample tree code to select the Cards with Code 1. These selected cards are the merchantable sawtimber Sitka Spruce and Western hemlock trees on the quality sample sub plots of the odd numbered field locations. An identifying X will be punched into column 76 of these selected cards.

The Location Volume Blow Up Master Card No. 68 will be placed before the cards of the Tree Volume Deck No. 11 for the quality species on the quality sub plots. The Scribner b.f. woods gross volume per acre will be calculated and punched for each card No. 11 by multiplying the Scribner b.f. woods gross volume by the location sawtimber quality volume blow up factor. This calculation will be proved using the tabulator as described in section 11.523.

11.5 Quality Summary Tabulations. The summary tabulations of quality data, that will be prepared and sent to the ARC regularly, are described in this section. Other tabulations can be prepared if desired. The requests for them should be accompanied by a table outline with complete headings and explanatory notes.

11.51 Forest Survey Report Tables. The Quality summary tabulations for the Forest Survey report tables are described and illustrated below. The proper deck of cards for a subregion will be used to prepare these tables.

11.511 Forest Survey Table 41 - Net Volume of quality logs in live merchantable sawtimber quality sample trees by species and log grade.

The Log Volume Deck No. 40 will be sorted by log grade and species; and minor, intermediate, and final totals of log Scribner b.f. net volume on a per acre basis will be accumulated.

The form of FS Table 41 is:

State	Sub Region	Species	Log Grade	Scribner b.f. net volume on per acre basis, by Log Grade	Species	Sub Region
02	x	xx	x	8x's*		
			etc	etc	8x's*	
		xx	etc	etc	etc	
						8x's*

11.512 Forest Survey Table 42 - Woods gross volume of live merchantable sawtimber trees of quality species on odd numbered field locations and of quality sample trees on quality sub plots by species.

The Tree Volume Deck No. 11 with an identifying X punch in column 69 will be sorted by species; and minor and final totals of the Scribner b.f. woods gross volumes on a per acre basis for all quality trees on odd numbered field locations (X 69 Cards), and for only the quality sample trees on the quality sub plots (X76 Cards) will be accumulated.

The form of FS Table 42 is:

			Scribner b.f. woods gross volume on per acre basis by			
			Species		Subregion	
State	Sub Region	Species	For all quality species	For quality Sample Trees	For all Quality Species	For Quality Sample Trees
02	x	xx	8x's*	8x's*		
		etc	etc	etc		
					8x's*	8x's*

11.513 Forest Survey Table 43 - Total net volume of live merchantable quality sawtimber by species.

The Volume Stratum Species and Diameter Volume Deck No. 17 (MC1, KV2) will be sorted to select the cards for Sitka Spruce (code 42) and Western hemlock (code 48). The selected cards will be sorted by species; and minor and final totals of the species total net volume will be accumulated.

The form of FS Table 43 is:

					Species total net volume, M ft, Scribner by	
State	Sub Region	MC	KV	Species	Species	Subregion
02	x	1	2	xx	8x's*	
				etc	etc	
						10x's*

11.52 Other Tables. The summary tabulations and listings prepared as a part of the quality compilation are described and illustrated below. Although the quality data will be summarized by subregion, these other tables may be prepared by survey unit.

11.521 Quality Table A - Proof of log gross volume calculation

This table is prepared in section 11.32.

The merged Percent of Tree Volume by Log Height and Position Master Deck No. 90 and the Log Volume Deck No. 40 will be tabulated to accumulate minor totals of the tree and log Scribner Dec. C gross volumes.

The form of quality Table A is:

State	SR	Log Ht. Class	Log Position	Log Percent of tree gross vol (2 dec)	Total Volumes, Scribner Dec C Gross: Tree	Total Volumes, Scribner Dec C Gross: Log
02	x	xx	xx	xxx	8x's*	8x's*
		etc	etc	etc	etc	etc

The calculation of the log gross volumes will be proved for each log ht class/log position group by multiplying the tree gross volume by the log percent of tree gross volume. The result must equal the log gross volume for the group.

11.522 Quality Table B - Proof of log net volume and log net volume per acre calculations.

This table is prepared in sections 11.32 and 11.33.

The Log Volume Deck No. 40 will be sorted by log merchantability factor; minor totals of the log Scribner Dec. C gross and net volumes will be accumulated; and final totals of the log Scribner Dec C net volume and Scribner b.f. net volume per acre will be accumulated.

The form of quality Table B is:

State	Sub Region	Log Merch. Factor (2 dec)	Log Volumes by Log Merch Factor: Scribner Dec C: Gross	Net	Subregion Net: Scr. Dec C	Net Per Acre: Scribner BF
02	x	xxx	8x's*	8x's*		
		etc	etc	etc		
					8x's*	8x's*

The Calculations of the log net volumes will be proved for each log merchantability factor class by multiplying the log gross volume by the merchantability factor. The result must equal the log net volume.

The Calculation of the log net volumes on a per acre basis will be proved by multiplying the final total volume on a log basis by the location sawtimber quality volume blow up factor of 6.6667. The result must equal the volume on a per acre basis.

11.523 Quality Table C - Proof of quality species and quality sample trees volumes on a per acre basis calculations.

This table is prepared in sections 11.41 and 11.42.

The merged Location Volume Blow Up Master Deck No. 68 and the Tree Volume Deck No. 11X69 X76 will be tabulated to accumulate final totals of the Scribner b.f. woods gross volumes on a tree basis and on a per acre basis separately for all trees of the quality species (X69) and for the quality sample trees (X76).

The form of quality Table C is:

State	Sub Region	Sawtimber Volume	Sawtimber Quality Volume	Scribner b.f. Woods gross Volumes for Quality Species: Tree Basis	Per Acre Basis	Quality Sample Trees: Tree Basis	Per Acre Basis
02	x	xxxxx	xxxxx	8x's*	8x's*	8x's*	8x's*

The Calculations of the volumes on a per acre basis will be proved by multiplying the volumes on a tree basis by the proper blow up factor. The results must equal the volumes on a per acre basis.

11.6 Compilation of Quality Error Data. The quality volume data will be compiled for sample error calculations for each volume stratum of a subregion. Compilation of these data may be done by survey unit, but summarization of the data will be by subregion. The Scribner b.f. net volume on a per acre basis of the quality logs on the odd numbered field locations will be utilized for this compilation. The compilation of these data for the quality volume error analysis is described in this section. The calculation and analysis of the quality volume sample error will be done by the ARC.

11.61 Preparation of Data. The Log Volume Deck No. 40 will be sorted by location/plot number to place all of the cards for a 3/5 acre field location together in a control group. The Log Volume Deck No. 40 will be tabulated; and the log Scribner b.f. net volume on a per acre basis will be accumulated for each control group (field location). This summary tabulation is described in section 11.631.

As the Log Volume Deck No. 40 is tabulated, the Location Quality Volume Error Summary Deck No. 49, described in section 16.42, will be summary punched. One card No. 49 will be punched automatically for each control group of Deck No. 40. Each card No. 49 will contain the items: state, subregion, survey unit, block, location number, land type, stand size class, and the location quality log volume on a per acre basis.

The summary punched Deck No. 49 will represent only part of the quality sample locations because many of the odd numbered field locations will have no quality species on the quality sub plot, or the quality species present will have no quality logs. The procedure described in the paragraphs that follow will be used to provide a Location Quality Volume Error Summary Card No. 49 for those quality sample locations that have no quality volume.

The Location Control Deck No. 10, prepared in section 5.1, will be sorted to select the cards for plot no. 1 of each location. From these cards, the cards for the odd numbered locations will be selected. The cards of the Location Control Deck No. 10 for plot no. 1 of the odd numbered locations and the Location Quality Volume Error Summary Deck No. 49 will be sorted in order by location number; and matched. The unmatched cards of Deck No. 10 will be for those locations that have no quality volume, and have no card No. 49.

The selected unmatched cards of Deck No. 10 will be used to reproduce additional Location Quality Volume Error Summary Cards No. 49. One card No. 49 will be prepared for each Card No. 10. The reproduced Cards No. 49 will contain the same items as the summary punched cards No. 49, except that the location quality volume will be punched as zero.

The reproduced and the summary punched cards will be combined into one Location Quality Volume Error Summary Deck No. 49, with one card for each odd numbered field location.

11.62 Calculation of Data. The location quality volume on a per acre basis will be squared and the square will be punched into each Location Quality Volume Error Summary Card No. 49. These calculations will be proved for each Card No. 49 using the calculator.

The Location Quality Volume Error Summary Deck No. 49 will be used in the quality volume error summary tabulations described in section 11.632.

11.63 Summarization of Data. The summary tabulations of quality volume error data, that will be prepared and sent to the ARC regularly, are described in this section. Tabulations other than those described can be prepared if desired. The requests for special quality volume error tabulations should include a table outline with complete headings and explanatory notes.

11.631 Quality Error Table A - Tabulation of Log Volume Deck No. 40 for summary punching the Location Quality Volume Error Summary Deck No. 49.

This table is prepared in section 11.61.

The Log Volume Deck No. 40 will be sorted by location/plot number and survey unit1/; minor totals of the controls and the quality log volume on a per acre basis will be accumulated and summary punched; and final totals of the controls, number of minor control breaks, and the quality log volume on a per acre basis will be accumulated.

1/ Included as a control item if required.

The form of Quality Error Table A is:

State	Sub Region	Survey Unit 1/	Block	Loc No	LT	SSC	B F	Quality Log Net Volume on Per Acre Basis Scribner	Final Totals of: Controls	No. of Minor Control Breaks	Quality Log Volume
02	x	xx	xx	xxxx	x	x	6x's*				
etc	etc	etc	etc	etc	etc	etc	etc				
									10x's*	4x's*	6x's*

The summary punched Location Quality Volume Error Summary Deck No. 49 will be tabulated at the end of the above table and final totals will be printed as follows:

State	Sub Region	Survey Unit 1/	Final Totals of: Controls	No. of Cards	Quality Log Volume
02	x	xx	10x's*	4x's*	6x's*

11.632 <u>Quality Error Table B - Number of field locations, sum of location quality volumes per acre, and sum of location quality volumes per acre squared by volume stratum.</u>

This table will be prepared for the use of the ARC in calculating the quality volume sample error.

The Location Quality Volume Error Summary Deck No. 49 for a subregion will be sorted by location number, survey unit stand size class, and land type; the data in each card will be listed; and minor totals of the number of locations, the location quality volume on a per acre basis, and the location quality volume on a per acre basis squared will be accumulated.

1/ Included as a control item if required.

The form of Quality Error Table B is:

State	Sub Region	Volume Stratum	Survey Unit	Block	Location Number	Quality Vols. on a Per Acre Basis, Scrib. b.f. net Location Volume	Location Volume Squared	No. of Locations
02	x	xx	xx	xx	xxxx	6x's	12x's	
etc	etc	etc	etc	etc	etc	etc	etc	
Volume stratum totals						8x's*	14x's*	4x's*
02	x	xx	xx	xx	xxxx	6x's	12x's	
etc	etc	etc	etc	etc	etc	etc	etc	
Volume stratum totals						8x's*	14x's*	4x's*
Etc. for all volume strata								

11.633 Quality Error Table C - Area of commercial forest land and merchantable total net volume of sawtimber by volume stratum.

This table will be prepared for the use of the ARC in calculating the quality volume sample error.

The Area/Volume Deck No. 03 for a subregion (LT 0 and 1, KV2) will be sorted by volume stratum; and minor and final totals of the acres and the merchantable net volume will be accumulated.

The form of Quality Error Table C is:

State	Sub Region	Kind	Volume Stratum	Volume Stratum Totals: Commercial Forest Area Acres	Volume Stratum Totals: Merchantable Net Volume M Ft.	Subregion Totals: Commercial Forest Area Acres	Subregion Totals: Merchantable Net Volume M Ft.
02	x	x	xx	8x's*	10x's*		
			etc	etc	etc		
						8x's*	10x's*

11.64 Other Data. The other data that can be used in the quality volume sample error calculations are the data summarized for the Forest Survey report tables as described in section 11.51.

GROWTH

12. THE GROWTH SAMPLE

The growth sample data will be obtained for merchantable trees on the field locations that occur in young growth sawtimber (SSC 3) and poletimber (SSC 2) stands. The old growth sawtimber, seedling/sapling, and nonstocked stands will not be sampled for growth.

The type of growth data obtained will be such that either of two methods can be used to compile the total net growth for an area. The data peculiar to each method will be obtained for all sample plots and merchantable trees in the growth sample. These data will be recorded in the Plot Records for the growth sample plots as described in section 4.2. The data will be punched into the Location Control Deck No. 10 as described in section 5.1, and into the Tree Work Deck as described in section 5.21.

The growth sample data obtained for the Yield Table method of analysis are described in section 12.1 and its compilation is described in section 13. The data obtained for the Tree method of analysis are described in section 12.2 and its compilation is outlined in section 14.

12.1 For Yield Table Method. The growth sample for the yield table method of analysis consists of all live merchantable trees 5.0" DBH and over on all sample plots of the field locations that occur in even aged young growth sawtimber and poletimber stands. The plot control items of site class and stand age are obtained especially for use with this method. These items will be recorded for each sample plot of each field location in the growth sample. The codes recorded for them may be different for the three plots at a location. The tree growth data for the yield table method are the same data recorded for the live merchantable trees of the volume sample. These data are described in sections 4.221 and 4.222. The live merchantable trees will be sampled for growth by the yield table method on various sized sub plots at each sample plot, as follows:

1/40 acre subplot: poletimber trees 5.0" to 10.9" DBH.
1/5 acre subplot: sawtimber trees 11.0" DBH and over.

The compilation of the growth sample data for the yield table method is described in section 13.

12.2 For Tree Method. The growth sample for the tree method of analysis consists of the live merchantable trees 5.0" DBH and over on the various sub plots of the sample plots at the field locations that occur in young growth sawtimber and poletimber stands. The growth sample items will be measured for trees in the various diameter groups on the subplots, as follows:

1/200 acre subplot:	diameter group 1; poletimber trees 5.0" to 10.9" DBH.
1/20 acre subplot:	diameter groups 2, 3, and 4; sawtimber trees 11.0" to 40.9" DBH.
1/5 acre subplot:	diameter group 5; sawtimber trees 41.0" DBH and over.

The tree growth data for the tree method, measured for each of the growth sample trees, are: 1/10" DBH, diameter growth 0 to 5 years and 0 to 10 years, and double bark thickness. These data will be recorded as described in sections 4.221, 4.222, and 4.23. In addition to the data recorded for the trees of the growth sample, the 1/10" DBH will be recorded for all live merchantable trees on the growth field locations.

The compilation of the growth sample data for the tree method is outlined in section 14.

13. GROWTH COMPILATION - YIELD TABLE METHOD.

The growth sample data, described in sections 12. and 12.1 will be compiled for the present, using the yield table method described in this section. These data may be compiled by survey units and the procedure is so written. However, the data will be combined by subregion for the summary tabulations of section 13.5. The cubic foot and International 1/4" b.f. net volumes will be compiled for the growth estimate by the yield table method.

13.1 Yield Table Master Deck No. 80. The purpose of this master deck is to assign the mean annual increment per acre to the sample plots located in evenaged young growth sawtimber and poletimber stands. The cubic foot and International 1/4" b.f. mean annual increments per acre are contained in the Yield Tables, as described in section 15.31.

The Yield Table Master Deck No. 80, described in section 16.71, will be key punched and verified from the Yield Tables. One card will be prepared for each stand age/site class entry of mean annual increments in the table. Each card No. 80 will contain the items: state, subregion1/, site class, stand age, and the cubic

1/ Included as a control item if required.

foot and International 1/4" b.f. mean annual increments per acre. Deck No. 80 will not be listed unless this is requested by the ARC.

The Yield Table Master Deck No. 80 will be used with the Plot Volume Summary Deck No. 30 as described in section 13.3.

13.2 Plot Volume Summary.

13.21 Preparation of Tree Volume Deck No. 11.

13.211 Selection of Evenaged ST and PT Stands. The Location Control Deck No. 10, prepared in section 5.1, will be sorted by stand size class to select the young growth sawtimber and poletimber stands (SSC 2 and 3). The selected cards will be sorted on stand age to select the cards coded 77, 88, or 99 which are not evenaged. The unselected cards of stand size classes 2 and 3 are for the evenaged young growth sawtimber and poletimber sample plots; and they will be referred to as the EA-YG Deck No. 10.

The Tree Volume Deck No. 11, prepared in section 5.3, will be sorted to select the merchantable trees of young growth sawtimber and poletimber stands (MC1; SSC 2 and 3). These selected cards of Deck No. 11 and the EA-YG Location Control Deck No. 10 will be sorted separately by location/plot number; and matched. The cards of Deck No. 11 that match those of the EA-YG Deck No. 10 will be for the trees on the sample plots located in evenaged young growth sawtimber and poletimber stands. They will be referred to as the EA-YG Deck No. 11.

13.212 Calculate Tree Scribner B.F. Net Volume. The Breakage Factor Master Deck No. 70 for MC1, prepared in section 3.7, and the EA-YG Tree Volume Deck No. 11 will be sorted by species and land type; and merged. The Scribner b.f. net volume will be calculated and punched for each EA-YG Card No. 11 by multiplying the Scribner b.f. woods gross volume by the breakage factor. This calculation will be proved using the calculator as described in section 13.521.

13.213 Calculate Tree International B.F. Net Volume. The Scribner to International 1/4" Ratio Master Deck No. 66, prepared in section 3.4, and the EA-YG Tree Volume Deck No. 11 will be sorted by 10" DBH group and species; and merged. The International 1/4" b.f. net volume will be calculated and punched for each EA-YG Card No. 11 by multiplying the Scribner b.f. net volume by the ratio. This calculation will be proved using the tabulator as described in section 13.522.

13.22 Plot Volume Summary Deck No. 30.

13.221 Summary Punch Deck No. 30. The EA-YG Tree Volume Deck No. 11 will be sorted by location/plot number to place all of the trees on a 1/5 acre sample plot together in a control group. The EA-YG Deck No. 11 will be tabulated; and the tree cubic foot and Int. 1/4" b.f. net volumes will be accumulated for each 1/5 acre sample plot. This summary tabulation is described in section 13.523.

As the EA-YG Tree Volume Deck No. 11 is tabulated, the Plot Volume Summary Deck No. 30, described in section 16.21, will be summary punched. One card No. 30 will be punched automatically for each 1/5 acre sample plot control group of EA-YG Deck No. 11. Each Card No. 30 will contain the items; state, subregion, survey unit, location/plot number, the cubic foot net volumes of poletimber separate from sawtimber, and the Int. 1/4" b.f. net volume of sawtimber.

The EA-YG Location Control Deck No. 10 and the Plot Volume Summary Deck No. 30 will be sorted by location/plot number; and merged. The control items of block, land type, local type, stand size class, stocking class, major type, site class, and stand age will be gang punched into the cards of Deck No. 30 from the cards of EA-YG Deck No. 10.

13.222 Calculate Plot Net Volumes per Acre. The Location Volume Blow Up Card No. 68, prepared in section 3.5, will be placed before the cards of the Plot Volume Summary Deck No. 30. The cubic foot net volume of poletimber will be raised to the sawtimber level and added to the cubic foot net volume of sawtimber by multiplying by the plot poletimber volume blow up factor. The cubic foot net volume of PT+ST and the Int. 1/4" net volume of ST will be raised to the per acre level by multiplying by the plot sawtimber volume blow up factor. The results of these calculations will be punched into each card No. 30. The calculations will be proved using the tabulator as described in section 13.524.

13.3 Plot Annual Increment per Acre. The Yield Table Master Deck No. 80, prepared in section 13.1, and the Plot Volume Summary Deck No. 30 will be sorted by site class and stand age; and merged. The cubic foot and Int. 1/4" b.f. mean annual increments per acre will be gang punched into the cards of Deck No. 30 from the Cards of Deck No. 80.

13.4 Use of Deck No. 30. The Plot Volume Summary Deck No. 30 will be used to prepare the growth summary tabulations from which the subregion growth percent will be calculated, as described in section 13.51.

13.5 Growth Summary Tabulations. The summary tabulations of growth data, that will be prepared for the even aged young growth sawtimber and poletimber stands and sent to the ARC regularly, are described in this section. Other tabulations of growth data can be prepared if desired. The requests for special growth summary tabulations should be accompanied by specific instructions, including a table outline with complete headings and explanatory notes.

13.51 Forest Survey Report Tables. The Forest Survey Report Tables are described and illustrated below. These tables will be prepared using the proper deck of cards for a subregion.

13.511 FS Table 21 - Net volume and mean annual increment per acre of the evenaged young growth sawtimber and poletimber growing stock on commercial forest land by sample plot, volume stratum, and subregion.

The Plot Volume Summary Deck No. 30 for a subregion will be sorted by location/plot number, survey unit, stand size class, and land type; the data punched in each card will be listed; and minor and final totals of the number of sample plots, the Plot cubic foot PT+ST and the Int. 1/4" b.f. ST net volumes per acre, and the plot cubic foot and Int. 1/4" b.f. mean annual increments per acre will be accumulated.

The form of FS Table 21 is:

State	SR	Strat	SU	Block	Loc/Plot No.	Site	Stand Age	Plot Net Volumes Per Acre: Cu.Ft. PT + ST	Plot Net Volumes Per Acre: Int. 1/4" b.f. ST	Plot Mean Annual Increment Per Acre: Cu.Ft.	Plot Mean Annual Increment Per Acre: Int. 1/4" b.f.
02	x	xx	xx	xx	xxxxx	xx	xx	6x's	6x's	3x's	4x's
		etc		etc	etc	etc	etc	etc	etc	etc	etc
End of listing for all plots in the volume stratum								8x's*	8x's*	6x's*	6x's*
02	x	xx	xx	xx	xxxxx	xx	xx	6x's	6x's	3x's	4x's
		etc		etc	etc	etc	etc	etc	etc	etc	etc
End of listing for all plots in the volume stratum								8x's*	8x's*	6x's*	6x's*
Etc for all volume strata of the Subregion											
End of listing of all plots for the Subregion								8x's*	8x's*	6x's*	6x's*

13.512 FS Table 22 - Area of and total net volume of young growth sawtimber and poletimber growing stock on commercial forest land by volume stratum and subregion.

The Area/Volume Deck No. 03 (KV 1 and 3) for a subregion will be sorted to select the cards for the young growth sawtimber and poletimber stands, SSC 2 and 3. The selected cards of Deck No. 03 will be sorted by stand size class and land type; and minor and final totals of the acres and the cubic foot and Int. 1/4" b.f. merchantable net volumes will be accumulated.

The form of FS Table 22 is:

				Total Merchantable Net Volume, M Ft, by			
			Total Commercial Forest Land	Volume Stratum		Subregion	
St	SR	Vol Strat	Acres	Cu ft	Int 1/4"b.f.	Cu ft	Int.1/4"b.f.
02	x	xx	8x's*	10x's*	10x's*		
		etc	etc	etc	etc		
			8x's*			10x's*	10x's*

13.52 Other Tables. The listings and summary tabulations prepared as a part of compiling the growth data are described and illustrated below. These tables will be prepared at the survey unit level.

13.521 Growth Table A - Proof of the tree Scribner b.f. net volume Calculation.

This table is prepared in section 13.212.

The merged Breakage Factor Master Deck No. 70 and the EA-YG Tree Volume Deck No. 11 will be tabulated to accumulate minor totals of the Scribner b.f. woods gross and net volumes.

The form of Growth Table A is:

State	Sub Region	Survey Unit	Merch Class	Land Type	Species	Breakage Factor (2 dec)	Sum of Scrib.b.f. Vols by Species Woods: Gross	Net
02	x	xx	x	x	xx	xxx	8x's*	8x's*
					etc	etc	etc	etc
				x	etc	etc	etc	etc

The calculation of the net volume will be proved for each species by multiplying the woods gross volume by the breakage factor. The result must equal the net volume.

13.522 Growth Table B - Proof of the tree Int. 1/4" b.f. net volume calculation.

This table is prepared in section 13.213.

The merged Scribner to International 1/4" Ratio Master Deck No. 66 and the EA-YG Tree Volume Deck No. 11 will be tabulated to accumulate minor and intermediate totals of the Scribner and Int. 1/4" b.f. net volumes.

The form of Growth Table B is:

St	SR	SU	Species	10" DBH Group	Ratio (2 dec)	Sum of Board Foot Net Volumes by 10" DBH Group: Scrib.	Int.1/4"	Species: Scrib	Int.1/4"
02	x	xx	xx	x	xxx	8x's*	8x's*		
				etc	etc	etc	etc	8x's*	8x's*
			xx	etc	etc	etc	etc	etc	etc
			etc	etc	etc	etc	etc	etc	etc

The Calculation of the Int. 1/4" b.f. net volume will be proved for each 10" DBH group (or species, if the ratio is the same for all 10" DBH groups of the species) by multiplying the Scribner volume by the ratio. The result must equal the Int. 1/4" volume.

13.523 Growth Table C - Tabulation of the EA-YG Tree Volume Deck No.11 for summary punching the Plot Volume Summary Deck No. 30.

This table is prepared in section 13.221.

The EA-YG Tree Volume Deck No. 11 will be sorted by location/plot number; minor totals of the controls and the tree cubic foot and Int. 1/4" b.f. net volumes will be accumulated and summary punched; and final totals of the controls, number of minor control breaks, and the tree cubic foot and Int. 1/4" b.f. net volumes will be accumulated.

The form of Growth Table C is:

									Final Totals					
				Sum of net volumes						No. of	Net Volumes			
			Loc/			Int.1/4"				Minor			Int.1/4"	
			Plot	Cu. Ft.(1 dec)		b.f.		Con-		Control	Cubic Foot		b.f.	
St:	SR:	SU:	No	PT	ST	ST		trols		Breaks	PT	ST	ST	
-2	x	xx	xxxxx	6x's*	6x's*	6x's*								
			etc	etc	etc	etc								
									6x's*	4x's*	6x's*	6x's*	6x's*	

The summary punched Plot Volume Summary Deck No. 30 will be tabulated at the end of the above table and final totals will be printed as follows:

					Final Totals of			
						Net Volumes		
			Con-	No. of	Cubic Foot			
St:	SR:	SU:	trols	Cards	PT	ST	Int. 1/4" b.f. ST	
02	x	xx	6x's*	6x's*	6x's*	6x's*	6x's*	

13.524 Growth Table D - Proof of calculation of plot volumes per acre.

This table is prepared in section 13.222.

The Plot Volume Summary Deck No. 30 will be tabulated to accumulate final totals of the cubic foot PT, ST and PT+ST and the Int. 1/4" b.f. ST plot net volumes, and the cubic foot PT+ST and Int. 1/4" b.f. ST plot net volumes per acre.

The form of Growth Table D is:

			Plot net Volumes				Plot Net Volumes per acre		
						Int. 1/4"			
Sub		Survey	Cubic Foot (1 dec)			b.f.	Cubic Foot	Int. 1/4" b.f.	
State	Region	Unit	PT	ST	PT+ST	ST	PT + ST	ST	
02	x	xx	8x's*	8x's*	8x's*	8x's*	8x's*	8x's*	

The calculation of the plot cubic foot net volume of PT+ST will be proved by multiplying the PT volume by the plot poletimber volume blow up factor and adding the result to the ST volume. The sum must equal the plot cubic foot net volume of PT+ST. The calculation of the plot net volumes per acre will be proved by multiplying the plot net volumes by the plot sawtimber volume blow up factor. The results must equal the plot net volumes per acre.

14. GROWTH COMPILATION - TREE METHOD.

The estimate of total net growth will be made using the yield table method of compilation described in section 13. In the future it may be necessary to make the growth estimate using the tree method of compilation. The tree method of compilation will be used to compile the growth data for young growth sawtimber and poletimber stands only. The data will be compiled and summarized at the subregion level.

The growth sample data for the tree method, described in section 12.2, will be collected on an area basis. These data will be compiled to obtain average gross growth per acre which will be applied to the stratum acres to obtain the total gross growth for a subregion. The total net mortality for the subregion will be subtracted from the total gross growth to obtain the total net growth.

The tree method of compiling the growth sample tree data is outlined in this section. Each step of the compilation procedure is given and the work to be done is indicated but no details are given. The data forms, the IBM card decks, and the summary tabulations are listed but they are not described or illustrated. The detailed procedure, data forms, IBM card decks, and summary tabulations will be prepared when and if they are required for compiling the growth data by the tree method.

14.1 Growth Master Decks

14.11 1/10" DBH Volume Table Master Deck No. 82. Key punch and verify from 1/10" DBH Tree Volume Table (section 15.41). Each card will contain the items: state, species group, species, 10" DBH group, 2" DBH Class, 1/10" DBH class, log height1/ and the tree cubic foot and Scribner Dec. C gross volumes (section 16.81). The Deck No. 82 will be used to gang punch the past and present volumes into the Tree Growth Deck No. 31 (section 14.24). List Deck No. 82 (section 14.82(1)).

1/ Included as a control item if required.

14.12 Growth Conversion Factor Master Deck No. 89.

This deck will be prepared following procedure similar to that described in section 3.8 for the Volume Conversion Factor Master Deck No. 71. The range of 10" DBH groups and individual plot sizes for which a card will be punched for each possible number of plots sampled from 3 through 300 is:

10" DBH Group	Individual Plot Size
1	0.005
2	0.050
3	0.050
4	0.050
5	0.200

Each Card No. 89 will contain the items: state, 10" DBH group, number of plots sampled, conversion factor, total acres sampled, and individual plot size (section 16.84). The Deck No. 89 will be used to gang punch the conversion factor, total acres sampled, and individual plot size into the Volume Stratum Average Growth per Acre Calculation Master Deck No. 85 (section 14.33). List Deck No. 89 (section 14.82(2).

14.2 Tree Growth Deck No. 31.

14.21 Reproduce Deck No. 31. Reproduced from the Tree Work Deck No. 21, prepared in section 5.2, for the merchantable (MC1) trees of young growth sawtimber and poletimber stands (SSC 2 and 3). Each card will contain the items: state, subregion, survey unit, block, location/plot number, land type, local type, stand size class, stocking class, tree number, species, present 2" DBH class, 10" DBH group, log height, and 1/10" DBH class, merchantability class, merchantability code or factor, and 10 year diameter growth (section 16.31).

14.22 Calculate 1/10" DBH 10 years ago. Subtract 10 year diameter growth from present 1/10" DBH; prove on tabulator (section 14.82(3)). Gang punch past 2" DBH class and 10" DBH group from the 2" DBH class and 10" DBH Group Master Deck No. 60 prepared in section 3.1.

14.23 Gang Punch Growth/Ingrowth. Gang punch into Deck No. 31 following codes of section 17.2(16).

14.24 Gang Punch Present and Past Tree Volumes. Gang punch present and past cubic foot and Scribner Dec C gross volumes into Deck No. 31 from the 1/10" DBH Volume Table Master Deck No. 82 (section 14.11). Separate runs required for punching present and past tree volumes.

14.25 Calculate 10 Year Gross Volume Increment. Calculate for each card No. 31. Subtract past gross volume from present gross volume for cubic foot and Scribner Dec C. Prove on tabulator (section 14.82(4)).

14.26 Calculate Cubic Foot Net and Scribner B.F. Woods Gross Volume Increment. Group Tree Growth Deck No. 31 by indicator species (codes 42, 48, 52, and 54) and all other species.

14.261 ST Trees of Indicator Species. From indicator species group, select 10" DBH groups 2, 3, 4, and 5. Merge with merchantability Factor Master Deck No. 64, prepared in section 3.3, and calculate cubic foot net and Scribner b.f. woods gross volume increments. Prove on tabulator (section 14.82(5)).

14.262 All Other Trees. Includes all PT trees and non-indicator sawtimber trees - all contain merchantability factors. Calculate cubic foot net and Scribner b.f. woods gross volume increments. Prove on tabulator (section 14.82(6)).

14.27 Use of Deck No. 31. Tree Growth Deck No. 31 will be listed if requested (section 14.82(7)), and will be used to prepare Deck No. 32 (section 14.31) and Deck No. 39 (section 14.91).

14.3 Average Gross Growth per Acre.

14.31 Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32. Summary punch from Tree Growth Deck No. 31. Summarize cubic foot net and Scribner B.F. woods gross 10 year volume increment by present 10" DBH group, species, and LT/SSC stratum (section 14.82(8)). Each card No. 32 will contain the items: state, subregion, land type, stand size class, merchantability class, species group, species, present 10" DBH group, and the stratum total 10 year volume increments for cubic foot net and Scribner b.f. woods gross (section 16.32).

14.32 Number of Plots Sampled by LT/SSC Stratum. Tabulate the Location Control Deck No. 10 for a subregion, prepared in section 5.1, and summary punch the Volume Stratum Average Growth per Acre Calculation Master Deck No. 85. Summarize the number of plots by LT/SSC stratum (section 14.82(9). Each card no. 85 will contain the items: state, subregion, land type, stand size class, merchantability class code 1, 10" DBH group code 1, and the number of plots sampled (section 16.82).

14.33 Completing the Volume Stratum Average Growth per Acre Calculation Master Deck No. 85. Reproduce four additional decks from the summary punched Deck No. 85. Combine the five decks and gang punch the conversion factor, total acres sampled, and individual plot size into each card No. 85 from the Growth Conversion Factor Master Deck No. 89 (section 14.12). List Deck No. 85 (section 14.82(10)).

14.34 Calculate Average Growth per Acre. Merge the Volume Stratum Average Growth per Acre Calculation Master Deck No. 85 and the Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32 (section 14.31); and calculate the cubic foot average net volume increment per acre and the Scribner b.f. average woods gross, volume increment per acre. Prove on tabulator (section 14.82 (11)).

14.35 Calculate Scribner B.F. Average Gross Growth per Acre. Merge the Breakage Factor Master Deck No. 70, prepared in section 3.7, and the Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32; and calculate the Scribner b.f. average net volume increment per acre. Prove on tabulator (section 14.82(12)).

14.36 Calculate International 1/4" Average Gross Growth per Acre. Merge the Scribner to International 1/4" Ratio Master Deck No. 66, prepared in section 3.4, and the Volume Stratum 10" DBH Group Gross Growth per acre Summary Deck No. 32; and Calculate the Int. 1/4" average net volume increment per acre. Prove on tabulator (section 14.82(13)).

14.4 Total Average Gross Growth per Acre Summary.

14.41 Table of Average Growth per Acre. Summarize average gross growth per acre - cubic foot, Int. 1/4" and Scribner b.f. - by volume stratum (LT/SSC stratum) (section 14.82(14)), using the Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32. Prepare the Table of Average Growth per Acre (section 15.42) from this tabulation. Include averages for non sampled strata. Also prepare Table of Species and Diameter Group Percents for non sampled Strata for Growth (section 15.43). These tables will be prepared by the ARC.

14.42 Volume Stratum Average Gross Growth per Acre Master Deck No. 87. Key punch and verify from the Table of Average Growth per Acre (section 15.42). Punch a card No. 87 for each volume stratum of the subregion. Each card will contain the items: state, subregion, land type, stand size class, species group, and the average gross growth per acre for cubic foot, Int. 1/4" and Scribner b.f. kinds of volume (section 16.83). List Deck No. 87 (section 14.82(15)).

14.5 Compilation of Total Gross Growth.

14.51 Area/Growth Deck No. 04. Reproduce Deck No. 04 from the Area/Volume Deck No. 03 KV 3 for SSC 2 and 3 of a subregion. Each card No. 04 will contain the items: state, subregion, survey unit, block, land type, local type, stand size class, stocking class, major type, species group, and acres (section 16.04).

14.52 Total Gross Growth Calculation. Merge the Volume Stratum Average Gross Growth per Acre Master Deck No. 87, prepared in section 14.42, and the Area/Growth Deck No. 04; and calculate the cubic, Int. 1/4", and Scribner total gross growth in M ft. Prove on tabulator (section 14.82(16)).

14.53 Volume Stratum Total Gross Growth Master Deck No. 35. Summary punch Deck No. 35 from the Area/Growth Deck No. 04. Summarize the cubic, Int. 1/4", and Scribner total gross growth by volume stratum for the subregion (section 14.82(17). Each card No. 35 will contain the items: state, subregion, volume stratum, merchantability class, kind volume, species group, and the stratum total gross growth for the kind of volume (section 16.35).

14.6 Compilation of Species and Diameter Group Total Gross Growth.

14.61 Species and Diameter Group Percent Calculation.

14.611 Volume Stratum Species and Diameter Group Average Gross Growth per Acre Summary for Decks No. 33 and No. 34.

14.611-1 Volume Stratum Total Average Gross Growth per Acre Master Work Deck No. 33. Summary punch from the Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32 (section 14.31). Summarize the Cubic, Int. 1/4", and Scribner average gross growth per acre by volume stratum (section 14.82(18). Punch one card No. 33 for each volume stratum. Each card No. 33 will contain the items: state, subregion, volume stratum, merchantability class, kind of volume, species group, and the average gross growth per acre for cubic, Int. 1/4", and Scribner kinds of volume (section 16.33). Reproduce an additional Deck No. 33 for each kind of volume.

14.611-2 Volume Stratum Species and Diameter Group Gross Growth per Acre and Percent Calculation Deck No. 34 X 1. Summary punch from the Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32 (section 14.31). One run required for each kind of volume. Summarize average gross growth per acre by 10" DBH group for each species of each volume stratum (section 14.82(19)). Punch one card No. 34X1 for each species of each volume stratum. Each Card No. 34 X 1 will contain the

items: state, subregion, volume stratum, merchantability class, kind of volume, species group, species, species total average gross growth per acre, and the total gross growth per acre for diameter groups 1, 2, 3, 4, and 5. (section 16.34).

14.611-3 Volume Stratum Species and Diameter Group Gross Growth per Acre and Percent Calculation Deck No. 34NX1. Reproduce from the Deck No. 34X1 (section 14.611-2). Each card No. 34NX1 will contain the items: state, subregion, volume stratum, merchantability class, kind of volume, species group, species, species total average gross growth per acre, and the total average gross growth per acre for diameter groups 1, 2, and 3 (section 16.34).

14.612 Calculation of Percents.

14.612-1 Species Percents. Merge the Deck No. 33(section 14.611-1) and the Deck No. 34NX1 (section 14.611-3); and calculate the species percents of the volume stratum total average gross growth per acre. Prove on tabulator (section 14.82(20).

14.612-2 Diameter Group Percents. Calculate and punch the diameter group percents of the species total average gross growth per acre: in Deck No. 34NX1 for groups 1, 2, and 3; and in Deck No. 34X1 for groups 4 and 5. Gang punch the percents for groups 4 and 5 into Deck No. 34NX1 from Deck No. 34X1. Prove on tabulator using Deck No. 34NX1 (section 14.82(20)).

14.613 Volume Stratum Species and Diameter Percent for Growth Deck No. 36. Reproduce from the Volume Stratum Species and Diameter Group Gross Growth per Acre and Percent Calculation Deck No. 34NX1. Key punch and verify from the Table of Species and Diameter Group Percents for non Sampled Strata for Growth (section 15.43). Each Card No. 36 will contain the items: state, subregion, volume stratum, merchantability class, kind of volume, species group, species, species percent of stratum growth, and the percents of species growth for diameter groups 1, 2, 3, 4, and 5 (section 16.36).

14.62 Species and Diameter Group Total Gross Growth Calculation.

14.621 Species Growth. Merge the Volume Stratum Total Gross Growth Master Deck No. 35 (section 14.53) and the Volume Stratum Species and Diameter Percent for Growth Deck No. 36 (section 14.613); and calculate the species total gross growth. Prove on tabulator (section 14.82(21)).

14.622 Diameter Group Growth. Reproduce the Volume Stratum Species and Diameter Gross Growth Deck No. 37 from the Deck No. 36. Each Card No. 37 will contain the items: state, subregion, volume stratum, merchantability class, kind of volume, species group, species, and the species total gross growth (section 16.37).

Merge the Decks No. 36 and No. 37 and calculate the total gross growth for diameter groups 1, 2, 3, 4, and 5. Prove on tabulator (section 14.82(22)).

14.7 Total Net Growth.

14.71 Net Growth Calculation. The total net growth will be calculated for a subregion by subtracting the total 10 year mortality from the total gross growth. The total gross growth will be summarized in section 14.81. The total mortality will be summarized in section 9.1. The calculation of total net growth will be done by the ARC.

14.72 Growth/Ingrowth. The total net growth can be proportioned to main growth or ingrowth using percents calculated from Growth Table Z-2 (section 14.82(23)). These calculations will be done by the ARC.

14.8 Growth Summary Tabulations.

14.81 Forest Survey Report Tables. Prepared at the subregion level.

14.811 F.S. Table 23 - Total Gross Growth of live sawtimber and growing stock on commercial forest land by accessibility class.

Use the Area/Growth Deck No. 04.

14.812 FS Table 24 - Total gross growth of live sawtimber and growing stock on commercial forest land by stand size class.

Use the Area/Growth Deck No. 04.

14.813 FS Table 25 - Total gross growth of live sawtimber and growing stock on commercial forest land by species. Use the Volume Stratum Species and Diameter Growth Deck No. 37.

14.814 FS Table 26 - Total gross growth of live sawtimber and growing stock on commercial forest land by species and diameter group. Use the Volume Stratum Species and Diameter Growth Deck No. 37.

14.815 FS Table 27 - Total gross growth of live sawtimber and growing stock on commercial forest land by survey unit and accessibility class.

Use the Area/Growth Deck No. 04.

14.816 FS Table 28 - Total gross growth of live sawtimber and growing stock on commercial forest land by survey unit and stand size class.

Use the Area/Growth Deck No. 04.

14.817 FS Table 29 - Total gross growth of live sawtimber and growing stock on commercial forest land by survey unit, timber management block, and kind of volume. Use the Area/Growth Deck No. 04.

14.82 Other Tables. Prepared at the subregion level.

14.82(1) Growth Table E - Listing of 1/10" DBH Volume Table Master Deck No. 82. This table is referred to in section 14.11.

14.82(2) Growth Table F - Listing of Growth Conversion Factor Master Deck No. 89. This table is referred to in section 14.12.

14.82(3) Growth Table G - Proof of calculation of 1/10" DBH 10 years ago for Deck No. 31. This table is prepared in section 14.22.

14.82(4) Growth Table H - Proof of Calculation of 10 year gross volume increment for Deck No. 31. This table is prepared in section 14.25.

14.82(5) Growth Table I - Proof of calculation of net volume increment for the ST trees of the indicator species for Deck No. 31, _____ Subregion. This table is prepared in section 14.261.

14.82(6) Growth Table J - Proof of calculation of net volume increment for all other trees for Deck No. 31. This table is prepared in section 14.262.

14.82(7) Growth Table K - Listing of Tree Growth Deck No. 31. This table is referred to in section 14.27.

14.82(8) Growth Table L - Tabulation of Tree Growth Deck No. 31 for summary punching the Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32. This table is prepared in section 14.31.

14.82(9) Growth Table M - Tabulation of Location Control Deck No. 10 for summary punching Volume Stratum Average Growth per Acre Calculation Master Deck No. 85. This table is prepared in section 14.32.

14.82(10) Growth Table N - Listing of the Volume Stratum Average Growth per Acre Calculation Master Deck No. 85. This table is prepared in section 14.33.

14.82(11) Growth Table O - Proof of Calculation of average gross growth per acre by 10" DBH group for Deck No. 32. This table is prepared in section 14.34.

14.82(12) Growth Table P - Proof of Calculation of Scribner b.f. average gross growth per acre for Deck No. 32. This table is prepared in section 14.35.

14.82(13) Growth Table Q - Proof of Calculation of International 1/4" b.f. average gross growth per acre, _____ Subregion, for Deck No. 32. This table is prepared in section 14.36.

14.82(14) Growth Table R - Total average gross growth per acre by volume stratum. This table is prepared in section 14.41.

14.82(15) Growth Table S - Listing of Volume Stratum Average Gross Growth per Acre Master Deck No. 87. This table is prepared in section 14.42.

14.82(16) Growth Table T - Proof of calculation of total gross growth for Deck No. 04. This table is prepared in section 14.52.

14.82(17) Growth Table U - Tabulation of the Area/Growth Deck No. 04 for summary punching the Volume Stratum Total Gross Growth Master Deck No. 35. This table is prepared in section 14.53.

14.82(18) Growth Table V - Tabulation of the Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32 for summary punching the Volume Stratum Total Average Gross Growth per Acre Master Work Deck No. 33. This table is prepared in section 14.611-1.

14.82(19) Growth Table W - Tabulation of the Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32 for summary punching the Volume Stratum Species and Diameter Group Gross Growth per Acre and Percent Calculation Deck No. 34X1. This table is prepared in section 14.611-2.

14.82(20) Growth Table X - Proof of Calculation of species and diameter group percents for Deck No. 14 NX1. This table is prepared in sections 14.612-1 and 2.

14.82(21) Growth Table Y - Listing of the Volume Stratum Species and Diameter Percent for Growth Deck No. 36 and proof of species total gross growth. This table is prepared in section 14.621.

14.82(22) Growth Table Z - 1 - Listing of the Volume Stratum Species and Diameter Group Gross Growth Deck No. 37 and proof of diameter group total gross growth. This table is prepared in section 14.622.

14.82(23) Growth Table Z - 2 - 10 year gross growth of sample trees by growth/ingrowth, present 1-" DBH group, and species. This table is referred to in section 14.72. Deck No. 31 will be used.

14.9 Compilation of Growth Error Data.

14.91 Preparation of Data. Summary punch the Location Growth Error Summary Deck No. 39 from the Tree Growth Deck No. 31. Summarize the 10 year volume increment, cubic foot net - PT separate from ST - and the Scribner b.f. woods gross, by 3/5 acre field location (section 14.931). Each card No. 39 will contain the items: state, subregion, survey unit, location number, land type, stand size class, and the location 10 year volume increment - cubic foot net for PT and ST, and Scribner b.f. woods gross for ST. (section 16.38). Gang Punch control items as necessary from Location Control Deck No. 10 (section 5.1).

14.92 Calculation of Data. Merge Location Volume Blow Up Deck No. 68 (section 3.5) and Location Growth Error Summary Deck No. 39. Blow up PT cubic foot 10 year net volume increment to ST level and add to ST increment. Blow up PT+ST cubic foot increment and ST Scribner b.f. increment to one acre level. Prove on tabulator (section 14.932). Square cubic foot PT+ST and Scribner b.f. ST 10 year increments per acre. Prove on calculator.

14.93 Summarization of Data. Done at the Subregion level.

14.931 Growth Error Table A - Tabulation of Tree Growth Deck No. 31 for summary punching the Location Growth Error Summary Deck No. 39. This table is prepared in section 14.91.

14.932 Growth Error Table B - Proof of calculation of location 10 year volume increment per Acre for Deck No. 39. This table is prepared in section 14.92.

14.933 Growth Error Table C - Number of field locations, sum of location volume increment per acre, and sum of location volume increment per acre squared by volume stratum. Use the Location Growth Error Summary Deck No. 39.

14.934 Growth Error Table D - Area of Young growth commercial forest land and total gross growth of young growth growing stock by volume stratum. Use the Area/Growth Deck No. 04.

DATA FORMS

15. DATA FORMS AND TABLES.

The data to be punched into IBM cards must be recorded in code on Data Forms prepared for this purpose, if maximum efficiency is to be realized from using the IBM method of compilation. These forms must be designed so that the data will flow in an orderly manner from the form to the IBM card. This allows the operator to make full use of the automatic duplicating features of the key punch, and it improves the production and accuracy of the key punching operation.

The Data Forms designed for use in recording the Alaska Forest Survey data are described and illustrated in this section. For each form, the source of the data is indicated, comments on the data and the form are included, and the use of the data is described.

The AL-FS Data Forms can be printed, typewritten, or prepared by hand; whichever method best will fit the preparation of the particular form.

15.1 Area Forms.

15.11 Record of Area, Form 9-1956. The Record of Area will be used by the ARC for recording the entries of control items and the number of photo plots of each stratum by block for each survey unit. The method of recording the data is described in section 2.2.

The Records of Area should be sent to the IBM Service Unit by survey unit groups, and should be accompanied by the Area Field Check Records (section 15.12), the Table of Area Control Data (section 15.13) and a map showing the survey unit and block bountaries and codes. The IBM Service Unit will transfer the stratum data into the Area Sample Deck No. 01 (section 16.01) as described in section 2.51.

The form of the Record of Area is:

IRVEY
956

RECORD OF AREA

	XX	02
	X	
Init	XX	

Computed by
Date
Checked by
Date

Land Type	Local Forest Type	Stand Size Class	Stocking Class	Number of Dots	Block	Land Type	Local Forest Type	Stand Size Class	Stocking Class	Number of Dots
X	XX	X	XX	XXXX	XX	X	XX	X	XX	XXXX

ites number of digits in Item Code

15.12 Area Field Check Record, Form 10-1956. The Area Field Check Record will be used by the ARC for recording the entries of the control items, photo and field, for each photo plot that is field checked in a survey unit. The method of recording the data is described in section 2.3.

The Area Field Check Record should be sent to the IBM Service Unit by survey unit groups, when the Records of Area (section 15.11) are submitted. The IBM Service Unit will transfer the area field check data into the Area Check Deck No. 06 (section 16.05), as described in section 2.52.

The form of the Area Field Check Record is:

15.13 Table of Area Control Data. The ARC will prepare a Table of Area Control Data for each survey unit of each subregion, as described in section 2.4. The Tables of Area Control Data will be sent to the IBM Service Unit with the Records of Area (section 15.11) to which the control data applies. The IBM Service Unit will use these data for area control purposes when the summary tabulations of Area are prepared (section 2.6). The area blow up factor will be transferred from the Tables into the Area Blow up Master Deck No. 50 (section 16.51) as described in section 2.56.

The form of the Table of Area Control Data is:

TABLE OF AREA CONTROL DATA

State XX _____ Compiled by _____

Subregion X _____ Date _____

Survey Unit XX _____ _____

Block	Land Type	Total No. of Photo Plots	Total No. of Photo Plots Field Checked	Block	Land Type	Total No. of Photo Plots	Total No. of Photo Plots Field Checked
XX	X			XX	X		

SURVEY UNIT DATA

A. Total No. of Photo Plots _____
B. Total No. of Photo Plots Field Checked _____
C. Total Land Area _____
D. Area Blow up Factor ($\frac{C}{A}$)1/ _____

X Indicates number of digits in item code.
1/ Recorded as an eight-digit number with five decimals.

JRVEY
956

AREA FIELD CHECK RECORD

	XX	02
n	X	
Jnit	XX	

Compiled by
Date

HOTO CLASS			FIELD CLASS					PHOTO CLASS				FIELD CLASS				
ocal orest Type	Stand Size Class	Stocking Class	Land Type	Local Forest Type	Stand Size Class	Stocking Class	Site	Land Type	Local Forest Type	Stand Size Class	Stocking Class	Land Type	Local Forest Type	Stand Size Class	Stocking Class	Site
XX	X	XX	X	XX	X	XX	XX	X	XX	X	XX	X	XX	X	XX	XX

otes number of digits in Item Code

15.2 Volume Forms.

15.21 Plot Record, Form 1 - Rev. 1956. The Plot Record will be used by the ARC for recording the entries of the control items for each sample plot, and the control items for each tree on the sample plot, in the inventory, growth, and quality samples of the Forest Survey. The items that will be recorded and the method of recording them are discussed in section 4.2.

The data recorded on the Plot Record should be checked thoroughly for complete, accurate, and legible codes before leaving the plot location. The Plot Records for the three plots at a location should be stapled together for transmittal to the IBM Service Unit. The Plot Records should be sent to the IBM Service Unit by survey unit or block groups, and accompanied by the Table of Volume Control Data (section 15.22).

The IBM Service Unit will transfer the plot control items into the Location Control Deck No. 10 (section 16.1(1)), as described in section 5.1; and the plot and tree control items into the Tree Work Deck No. 21 (section 16.1(10)), as described in section 5.21.

The form of the Plot Record is:

(NOTE: For field use, the Plot Record is printed on the front and back of 5" X 8" cards of waterproof paper).

15.22 Table of Volume Control Data. The ARC will prepare a Table of Volume Control Data for each survey unit or block. This table will show the number of field locations sampled by land type, as described in section 4.3. The Table of Volume Control Data should be sent to the IBM Service Unit with the Plot Records to which the data applies. The IBM Service Unit will use the data in these tables as the control for the number of field locations when compiling volume.

The form of the Table of Volume Control Data is:

TABLE OF VOLUME CONTROL DATA

State XX _____ Compiled by _____

Subregion X _____ Date _____

Survey Unit XX _____ _____

Block	Land Type	Total No. of Field Locations	Block	Land Type	Total No. of Field Locations
XX	X		XX	X	

Survey Unit Total No. of Field Locations _____

X Indicated number of digits in item code.

RE-AL
Form 1, Rev. 1956

PLOT RECORD

FOREST SURVEY

State ______ xx ______ 02
Subregion ______ x ______
Survey Unit ______ xx ______
Block ______ xx ______
Loc-Plot No. ______ xxxx-x ______-
Land Type ______ x ______
Local Type ______ xx ______
Stand Size Class ______ x ______
Stocking Class ______ xx ______
Site ______ xx ______
Stand Age ______ xx ______
Stand Height ______ xxx ______

Ver. Photo No. ______
Obl. Photo No. ______
Location ______
Photo RP: Sp. ______, DBH ______
Az. from RP ______, Dist. ______
Plot Az. ______, Decl. ______
Sub Plot Ref. Az. ______
Sub Plot Ref. ______ ft, Sp. ______ DBH ______
Slope ______
Photo Class ______
Crew ______
Date ______

LIVE PT and ST							GROWTH				QUALITY							
								Diam.Growth			Log Grade/Merch. Factor by Position							
											1		2		3		4	
Tree Number	Species	2" DBH	Log Height	Merch. Cl.	Merch. Factor	Cause Death	1/10" DBH	0-5 Yrs.	0-10 Yrs.	D. B. T.	Gr	MF / Gr	Gr	MF / Gr	Gr	MF / Gr	Gr	MF / Gr
xx	xx	xx	xx	x	xx	x	xxx	xxx	xxx	xxx	x	xxx	x	xxx	x	xxx	x	xxx
						0												
						0												
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						0												

Continue LIVE PT & ST tally on back of this card. x Indicates number of digits in Item Code.

Loc-Plot No. xxxx-x ______-

LIVE PT and ST

Tree Number	Species	2" DBH	Log Height	Merch. Cl.	Merch. Factor	Cause Death
xx	xx	xx	xx	x	xx	x
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0
						0

MORTALITY PT and ST

Tree Number	Species	2" DBH	Log Height	Merch. Cl.	Merch. Factor	Cause Death
xx	xx	xx	xx	x	xx	x
				7		
				7		
				7		
				7		
				7		
				7		
				7		
				7		
				7		
				7		
				7		
				7		

SALVABLE DEAD - ST

				8		8
				8		8
				8		8
				8		8
				8		8
				8		8
				8		8
				8		8
				8		8
				8		8
				8		8
				8		8

PLOT SKETCH

BREAKAGE

Species	Percent	Species	Percent

REMARKS

15.23 Tree Volume Table. The ARC will furnish Tree Volume Tables, based on 2" DBH class and log height class, for each species or group of species for which they wish tree volumes assigned, as described in section 5.22. Only one table will be required for each species if the same table can be used for all subregions. Otherwise, tables must be prepared for the species in each subregion.

The Tree Volume Tables should include volume entries, cubic foot and Scribner Dec C, for the complete range of tree sizes that are expected to be encountered in the volume sample. The cubic foot volumes will be recorded as five-digit numbers with one decimal and the Scribner Dec C volumes will be recorded as four-digit numbers (to the nearest 10 board feet) with no decimals.

The Tree Volume Tables must be sent to the IBM Service Unit before the volumes can be punched into the Tree Work Deck, as described in section 5.22. The IBM Service Unit will transfer the volumes into the Volume Table Master Deck No. 62 (section 16.6(2)) as described in section 3.2.

The form of the Tree Volume Table is:

TREE VOLUME TABLE

State XX _____ Subregion X _____

Species Group X _____ Form Class _____ At _____ ft.1/

Species XX2/ _____

10" DBH Group	2" DBH Class	Tree Volume by Log Height Class3/ 00 C.F. 4/	00 B.F. 5/	01 C.F.	01 B.F.	02 C.F.	02 B.F.	03 C.F.	03 B.F.	04 C.F.	04 B.F.	05 C.F.	05 B.F.	06 C.F.	06 B.F.	07 C.F.	07 B.F.	etc-> C.F.	etc-> B.F.
0	02	-0-	-0-	-	-	-	-												
	04	-0-	-0-	-	-	-	-												
1	06	-	-	5x's	-0-	-	-												
	08	-	-	5x's	-0-	-	-												
	10	-	-	5x's	-0-	-	-												
2	12	-	-	5x's	4x's	5x's	4x's	5x's	4x's	5x's	4x's	5x's	4x's	5x's	4x's	5x's	4x's	5x's	4x's
	14	-	-																
	16	-	-																
	18	etc	etc																
	20																		
3	22																		
etc	etc																		
9 6/	99																		

X Indicates number of digits in item code.

1/ Average form class at 16 or 32:

2/ Record codes of each species for which the Table is to be used.

3/ Height in number of 16' logs to merchantable top.

4/ C.F. = cubic foot volumes to a 4" top d.i.b., recorded as five - digit numbers with one decimal.

5/ B.F. = Scribner Dec. C board foot volumes to a merchantable top d.i.b., recorded as four digit numbers to the nearest 10 board feet.

6/ One entry for log height 99 with zero volume.

15.24 Table of Average Merchantability Factors. The Tables of Average Merchantability Factors will be prepared by the ARC. One set of tables will be prepared for use in all subregions. These tables will contain the merchantability factors (the compliments of the indicator factor from the ARC Station paper No. 6, August 1956 - "Cull Factors for Sitka Spruce, Western Hemlock, and Western Redcedar in Southeast Alaska" by James W. Kimmey) recorded as two digit numbers with two decimals. The factors will be used with the sawtimber trees of the indicator species - Sitka spruce, Western hemlock, Alaska Cedar, and Western redcedar - as described in sections 5.321 and 14.261.

The Tables of Average Merchantability Factors must be sent to the IBM Service Unit before the tree net and woods gross volumes can be calculated, as described in section 5.321. The IBM Service Unit will transfer the average merchantability factors to the Merchantability Factor Master Deck No. 64 (section 16.6(3)), as described in section 3.3.

The form of the Table of Average Merchantability Factors is:

TABLE OF AVERAGE MERCHANTABILITY FACTORS1/

State XX _____

Species Group X _____

Merchantability Class X _____

2/ Species	2" DBH Class	Merch. Factor by Indicator3/ 00 C.F.4/	00 B.F.5/	01 C.F.	01 B.F.	02 C.F.	02 B.F.	Species	2" DBH Class	Merch. Factor by Indicator 00 C.F.	00 B.F.	01 C.F.	01 B.F.	02 C.F.	02 B.F.
XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

X Indicated number of digits in item code.

1/ Kimmey factors for Indicator Species.

2/ Record codes of each species for which the Table is to be used. The indicator species are the merchantable sawtimber: Sitka Spruce - 42, Western Hemlock - 48, Alaska Cedar - 52, and Western redcedar - 54.

3/ Indicators are: 00 = no defect indicators; 01 = Defect indicators on either the upper or lower bole; 02 = Defect indicators on both the upper and lower bole.

4/ CF = cubic foot factors to 4" top d.b. record as two digits.

5/ BF = Board foot factors to merchantable top d.b. recorded as two digits.

15.25 Table of Breakage Factors. The ARC will prepare a separate Table of Breakage Factors for the merchantable, mortality, and salvable dead merchantability classes of each survey unit. The breakage factors will be recorded as three-digit numbers, with two decimals, for each species of each commercial land type. (LT 0 and 1).

The Tables of Breakage Factors must be sent to the IBM Service Unit before the Scribner b.f. average net volumes per acre can be calculated as described in section 6.24. The breakage factors also will be used in the growth compilation, as described in section 13.212. The IBM Service Unit will transfer the breakage factors into the Breakage Factor Master Deck No. 70 (section 16.6(9)), as described in section 3.7.

The form of the Table of Breakage Factors is:

TABLE OF BREAKAGE FACTORS1/

State XX _____ Species Group X _____

Subregion X _____ Merchantability Class X 2/ _____

Survey Unit XX _____

Land Type3/	Species	Breakage Factor	Land Type3/	Species	Breakage Factor
X	XX	X.XX	X	XX	X.XX
0			1		

X Indicates number of digits in item code.
1/ For application to Scribner B.F. woods gross volume only.
2/ Separate Tables for merchantability classes 1, 7, and 8; no Tables for MC 2 and 3.
3/ 0 = Inaccessible commercial; 1 = accessible commercial. Separate factors for inaccessible and accessible.

15.26 Table of Scribner to International 1/4-Inch Ratios. The ARC will prepare a Table of Scribner to International 1/4 - inch Ratios that will be used for all survey units of all subregions. The ratios will be recorded as three-digit numbers, with two decimals, for all 10" DBH groups of each species in the volume sample.

The Tables of Scribner to International 1/4 - inch Ratios must be sent to the IBM Service Unit before the Int. 1/4" average net volumes per acre can be calculated as described in section 6.25. The ratios also will be used in the growth compilation as described in sections 13.213 and 14.36. The IBM Service Unit will transfer the ratios into the Scribner to International 1/4" Ratio Master Deck No. 66 (section 16.6(5)), as described in section 3.4.

The form of the Table of Scribner to International 1/4 - inch Ratios is:

TABLE OF SCRIBNER TO INTERNATIONAL 1/4-INCH RATIOS

State XX_____

(To be used for all Survey Units)

Species: Group	Species:	10" DBH: Group	1/ Ratio:	Species: Group	Species:	10" DBH: Group	1/ Ratio
X	XX	X	X.XX	X	XX	X	X.XX

X Indicates number of digits in item code.
1/ Ratio for converting Scribner b.f. Volume to International 1/4 - inch b.f. volume.

15.27 Table of Average Volumes per Acre. This table will be prepared by the ARC as described in section 6.31. Three tables will be prepared for each survey unit - one for each kind of volume - containing the volume stratum merchantability class volumes (except for mortality) recorded as five - digit numbers with no decimals. Separate tables will be prepared at the subregion level for the mortality volumes. The volume for all species groups will be combined but only one kind of volume should be in a table. Average volumes per acre must be included for the non sampled strata.

The IBM Service Unit will transfer the average volumes per acre into the Volume Stratum Average Net Volume per Acre Master Deck No. 67 (section 16.6(6)), as described in section 6.32

The form of the Table of Average Volumes per Acre is:

TABLE OF AVERAGE VOLUMES PER ACRE

State XX _____

Subregion X _____

Survey Unit XX _____

Stratum 1/			Vol. Strat.	Species Group	Kind of Volume	Average Net Volumes per Acre 2/				
						1- Merchantable	2- So. Cull	3- Ro. Cull	7- Mortality	8- Salv. Dead
LT	T 3/	SSC								
			XX	X	X	5x's	5x's	5x's	5x's	5x's

X Indicates number of digits in item code.

1/ LT/SSC strata included in the volume stratum.

2/ Calculated by Survey Unit for merchantable, sound cull, rotten cull, and salvable dead. Calculated by Subregion for mortality.

3/ Included as a control item if required.

15.28 Table of Species and Diameter Group Percents for Non Sampled Strata. This table will be prepared by the ARC. One table will be prepared for each MC/KV of each survey unit that has non sampled LT/SSC strata.

The table will show, for each species of each non sampled stratum, the species percents of the stratum volume and the diameter group percents of the species volume. The percents will be recorded as five-digit numbers with four decimals. The percents for only one merchantability class and kind of volume will be recorded in a table.

If in the Tables of Average Volumes per Acre (section 15.27), a non sampled LT/SSC stratum was included in a volume stratum that contains sampled LT/SSC strata, then this particular non sampled stratum should not be included in this table. The percents for the sampled strata will be used for all of the strata in the volume stratum.

The Table of Species and Diameter Group Percents for Non Sampled Strata must be sent to the IBM Service Unit before the species and diameter group volumes can be calculated as described in section 8.2. The IBM Service Unit will transfer the percents into the Volume Stratum Species and Diameter Percent Deck No. 16 (section 16.1(7)), as described in section 8.13.

The form of the Table of Species and Diameter Group Percents for Non Sampled Strata is:

TABLE OF SPECIES AND DIAMETER GROUP PERCENTS FOR NON SAMPLED STRATA

State XX _____ Merchantability Class X _____

Subregion X _____ Kind of Volume X _____

Survey Unit XX _____ Species Group X _____

Stratum 1/ LT	T 2/	SSC	Stratum Volume	Species	Species Percent of Stratum Volume	Diameter Group Percents of Species Volume Gr 1	Gr 2	Gr 3	Gr 4	Gr 5
		XX		XX	X.XXXX	X.XXXX	X.XXXX	X.XXXX	X.XXXX	X.XXXX

X Indicates number of digits in item code.
1/ LT/SSC strata included in the volume stratum.
2/ Included as a control item if required.

15.29 Table of Sawlog Cubic Volume Factors. The ARC will prepare this table, recording the sawlog cubic volume factors for each 10" DBH group of each species. The table will be prepared only for the merchantable merchantability class. Separate tables can be prepared for each survey unit or subregion; or the same table can be used for the entire area. The sawlog cubic volume factors will be recorded as two-digit numbers with two decimals.

The Table of Sawlog Cubic Volume Factors must be sent to the IBM Service Unit before the sawlog cubic volumes can be compiled, as described in section 8.3. The IBM Service Unit will transfer the factors into the Sawlog Cubic Volume Factor Master Deck No. 69 (section 16.6(8)), as described in section 3.6.

The form of the Table of Sawlog Cubic Volume Factors is:

TABLE OF SAWLOG CUBIC VOLUME FACTORS

State XX _____ Merchantability Class X 1/

Subregion X 1/ Kind of Volume X 1/

Survey Unit XX 1/

Species Group	Species	10" DBH Group	Factors	Species Group	Species	10" DBH Group	Factors
X	XX	X	.XX	X	XX	X	.XX

X Indicates number of digits in item code
1/ Included as a control item if required.

15.3 Growth Forms - Yield Table Method.

15.31 Yield Table. The ARC will prepare the Yield Table from Tables 15 and 16 of USDA Technical Bulletin No. 412, March 1934 - "Yield of Second-Growth Western Hemlock-Sitka Spruce Stands in Southeastern Alaska", by R. F. Taylor. The Yield Table will contain the mean annual increment per acre for cubic foot (three-digits, no decimals) and Int. 1/4" b.f. (four-digits, no decimals) volumes by stand age and site class. If the same Yield Table is used for all subregions, only one table will be prepared; otherwise a table must be prepared for each subregion.

The Yield Table must be sent to the IBM Service Unit before the growth compilation can be completed as described in section 13.3. The IBM Service Unit will transfer the yield data into the Yield Table Master Deck No. 80 (section 16.71), as described in section 13.1.

The form of the Yield Table is:

YIELD TABLE

State X X _____

Subregion X 1/ _____

Stand:	Mean Annual Increment per Acre, by Site Class																	
Age	7		08		09		10		11		12		13		14		15	
Yrs	C.F. 2/	B.F. 3/	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.	C.F.	B.F.
XX	XXX	XXXX	XXX	XXXX	XXX	XXXX	XXX	XXXX	XXX	XXXX	XXX	XXXX	XXX	XXXX	XXX	XXXX	XXX	XXXX
03																		
04																		
05																		
06																		
07																		
08																		
09																		
10																		
11																		
12																		
13																		
14																		
15																		

X Indicates number of digits in item code.

1/ Included as a control item if required.

2/ C.F. = Cubic foot mean annual increment per acre, stand 5.0" and over in DBH to a 4" top d.i.b.

3/ B.F. = International 1/4" b.f. mean annual increment per acre, stand 11.0" and over in DBH to a merchantable top d.i.b.

15.4 Growth Forms - Tree Method.

The data forms that will be required if the tree method of compiling growth is used, are listed in the following sub sections. These forms will be described and illustrated if and when they are required.

15.41 1/10" DBH Tree Volume Table. Prepared by the ARC. The data will be transferred into the 1/10" DBH Volume Table Master Deck No. 82 (section 16.81), as described in section 14.11; and will be used as described in section 14.24

15.42 Table of Average Growth per Acre. Prepared by the ARC as described in section 14.41. The data will be transferred into the Volume Stratum Average Gross Growth per Acre Master Deck No. 87 (section 16.83), as described in section 14.42; and will be used as described in section 14.52.

15.43 Table of Species and Diameter Group Percents for Non Sampled Strata for Growth. Prepared by the ARC as described in section 14.41. The data will be transferred into the Volume Stratum Species and Diameter Percent for Growth Deck No. 36 (section 16.36), as described in section 14.613; and will be used as described in section 14.62.

15.5 Quality Forms.

15.51 Table of Tree Gross Volume Percents by 16' Log Height and 16' Log Position. This table will be prepared by the ARC once for the Alaska Forest Survey. The log percents of the tree gross volume, recorded as three-digit numbers with two decimals, will be shown for each log position of each total height class. The log percents of the tree gross volume for all log positions of a total height class must sum to 1.00.

The Table of Tree Gross Volume Percents must be sent to the IBM Service Unit before the log volumes can be compiled as described in section 11.32. The IBM Service Unit will transfer the log percents into the Percent of Tree Volume by Log Height and Position Master Deck No. 90 (section 16.91), as described in section 11.2.

The form of the Table of Tree Gross Volume Percents by 16' Log Height and 16' Log Position is:

TABLE OF TREE GROSS VOLUME PERCENTS
BY 16' LOG HEIGHT AND 16' LOG POSITION

State XX _____

For use with Kind of Volume X _____

Based on Form Class Volume Tables with Form Class at 1/ Ft.

Log Position	Number of Logs per Tree - Log Height									
	01	02	03	04	05	06	07	08	09	10
	Percent of Tree Gross Volume									
	X.XX	X.XX	X.XX	X.XX	X.XX	X.XX	X.XX	X.XX	X.XX	X.XX
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										

X Indicates number of digits in item code.
1/ 16' or 32'.

IBM CARD DECKS

16. IBM CARD DECK DESCRIPTIONS

The basic operating unit of the IBM method of compilation is the IBM card. The cards, containing the basic data in the form of punched holes, actuate the various IBM machines causing them to perform automatically the operations essential to the IBM method of compilation. Once punched and verified, the IBM card is a permanent record of one item of a particular kind of data. The unit record IBM cards for all items of a particular kind of data make up the IBM card deck.

Each deck of IBM cards is identified by a deck number which will be punched in each card. This number distinguishes one deck from another and positively identifies the cards for each step of the compilation procedure.

The IBM card decks required to compile the Alaska Forest Survey data for area, volume, growth, and quality are:

Deck Number	Deck Name
	DETAIL CARD DECKS
01-09	AREA
01	Area Sample
02	Area Summary
03	Area/Volume
04	Area/Growth*
05	
06	Area Check
07	Area Work
08	
09	
10-29	VOLUME
10	Location Control
11	Tree Volume
12	Volume Stratum 10" DBH Group Net Volume per Acre Summary
13	Volume Stratum Total Average Net Volume per Acre Master Work
14	Volume Stratum Species and Diameter Group Total Average Net Volume per Acre and Percent Calculation; NX1 = Groups 1, 2, and 3; X1 = Groups 4 and 5
15	Volume Stratum Total Volume Master

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* Decks required for the tree method of growth compilation (section 14). Deck descriptions not included in this Plan.

Deck Number	Deck Name
16	Volume Stratum Species and Diameter Percent
17	Volume Stratum Species and Diameter Volume
18	
19	
20	Location Merchantable Volume Error Summary
21	Tree Work
22	
23	Species and Diameter Group Total Cubic, Sawlog Cubic, and Upper Stem Cubic Volume
24	
25	
26	
27	
28	
29	Location Mortality Volume Error Summary
30-39	GROWTH
30	Plot Volume Summary
31	Tree Growth *
32	Volume Stratum 10" DBH Group Gross Growth per Acre Summary *
33	Volume Stratum Total Average Gross Growth per Acre Master *
34	Volume Stratum Species and Diameter Group Gross Growth per Acre and Percent Calculation; NX1 = Groups 1, 2, and 3; X1 = Groups 4 and 5. *
35	Volume Stratum Total Gross Growth Master *
36	Volume Stratum Species and Diameter Percent for Growth *
37	Volume Stratum Species and Diameter Gross Growth *
38	
39	Location Growth Error Summary *
40-49	QUALITY
40	Log Volume
41	
42	
.	
.	
.	
48	
49	Location Quality Volume Error Summary

MASTER CARD DECKS

50-59	AREA
50	Area Blow Up
51	Area Photo Stratum
52	Area Correction Factor

Deck Number	Deck Name
53	
54	
55	
60-79	VOLUME
60	2" DBH Class and 10" DBH Group
61	
62	Volume Table
63	
64	Merchantability Factor
65	Volume Stratum Average Volume per Acre Calculation
66	Scribner to International 1/4" Ratio
67	Volume Stratum Average Net Volume per Acre
68	Location Volume Blow Up
69	Sawlog Cubic Volume Factor
70	Breakage Factor
71	Volume Conversion Factor
72	
73	
80-89	GROWTH
80	Yield Table
81	
82	1/10" DBH Volume Table *
83	
84	
85	Volume Stratum Average Growth per Acre Calculation *
86	
87	Volume Stratum Average Gross Growth per Acre *
88	
89	Growth Conversion Factor *
90-99	QUALITY
90	Percent of Tree Volume by Log Height and Position
91	
92	
93	

The card decks are described in the same order as they are listed above. The descriptions include the source of the data, the method of punching, the purpose of the deck, the card color and corner cut, and the data to be punched by card column. Card columns 1 and 2 of all decks will be reserved for the deck number.

Then the control items1/ will be punched in the same order as they appear on the Data Forms, usually in descending order of application. The quantitative items2/ will be punched following the control items. Special controlling and identifying X(11) and 12 position punches will be placed in selected columns of certain cards and decks as noted. IBM stock form #733727 will be used for the cards of all decks.

The punching card columns and the corresponding item of data to be punched in that column field are given in the following subsections for each IBM card deck required to compile the Alaska Forest Survey Data.

16.0 Area Detail Decks.

16.01 No. 01 - Area Sample Deck. Key punched and verified from the Record of Area (section 15.11), as described in section 2.51. The final number of strata from the field check will be gang punched using the Area Photo Stratum Master Deck No. 51 (section 16.52), as described in section 2.541.

This deck will be used to prepare the Area Work Deck No. 07 (section 16.06), as described in section 2.54.

The Area Sample Deck will consist of plain manila - A cards with a top right corner cut.

The description of the Area Sample Deck No. 01 is:

1/ Control items are those items that identify the original source (like state, survey unit, block, and location number); and those items used to cross index and classify the data to produce the desired summaries (like land type, stand size class, and species).

2/ Quantitative items are those items to be added, subtracted, multiplied, or divided (like area, volume, growth, and factors and ratios).

Deck No. 01

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-11	Ownership1/
12	Land Type
13-14	Local Type
15	Stand Size Class
16-17	Stocking Class
18-19	Major Type1/
20-21	Volume Stratum1/
22-25	Number of Photo Plots from original Photo Classification (0 dec)
26-78	Blank Columns
79-80	Final Number of strata from Field Check

X Punches

70	Control X Punch

12 Punches

71	Control 12 punch

16.02 No. 02 - Area Summary Deck. Summary punched from the Area Work Deck No. 07 (section 16.06), as described in section 2.55. The acres will be calculated using the Area Blow Up Master Deck No. 50 (section 16.51), as described in section 2.57.

The Area Summary Deck No. 02 will be used to prepare the Area/Volume Deck No. 03 (section 16.03), as described in section 7.1; and to prepare area summary tabulations as described in sections 2.61 and 2.62.

This deck will consist of plain manila - A cards with a top left corner cut.

The description of the Area Summary Deck No. 02 is:

1/ Included as a control item if required.

Deck No. 02

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-11	Ownership1/
12	Land Type2/
13-14	Local Type2/
15	Stand Size Class2/
16-17	Stocking Class2/
18-19	Major Type
20-21	Volume Stratum
22-23	Blank Columns
24-29	Acres (0 dec)
30-35	Number of Photo Plots (2 dec)
36-80	Blank Columns

X Punches

80	Control X punch

12 Punches

79	Control 12 punch

16.03 No. 03 - Area/Volume Deck. Reproduced for all commercial forest areas, land types 0 and 1, from the Area Summary Deck No. 02 (section 16.02), as described in section 7.1. One complete deck will be reproduced for each of the three kinds of volume. The total volumes will be calculated using the Volume Stratum Average net Volume per Acre Master Deck No. 67 (section 16.66), as described in section 7.2.

The Area/Volume Deck No. 03 will be used to prepare: the Volume Stratum Total Volume Master Deck No. 15 (section 16.1(6)), as described in section 7.3; the Block Volume Stratum Total Volume Master Deck No. 15X1 (section 16.1(6)), as described in section 8.41; the Area/Growth Deck No. 04 (16.04), as described in section 14.51; Volume Error Table D, as described in section 10.314;

1/ Included as a control item if required.
2/ Corrected for field check.

Mortality Error Table C, as described in section 10.323; Quality Error Table C, as described in section 11.633; and part of the Forest Survey volume and growth tables, as described in sections 9.1 and 13.51.

This deck will consist of manila-A cards with a P-green top stripe and a top right corner cut.

The description of the Area/Volume Deck No. 03 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-11	Ownership1/
12	Land Type
13-14	Local Type
15	Stand Size Class
16-17	Stocking Class
18-19	Major Type
20-21	Volume Stratum1/
22	Species Group
23	Kind of Volume
24-29	Acres (0 dec)
	Total Net Volumes, M ft. (0 dec)
30-37	Merchantable, MC 1
38-44	Sound Cull, MC 2
45-51	Rotten Cull, MC 3
52-58	Mortality, MC 7
59-65	Salvable Dead, MC 8
66-80	Blank Columns
	X Punches
60	Control X punch
	12 Punches
65	Control 12 punch

1/ Included as a control item if required.

16.04 No. 04 - Area/Growth Deck. This deck will be used in the growth compilation by the tree method. It will be prepared and used as outlined in sections 14.5 and 14.81. The description of this deck will be prepared if and when required.

16.05 No. 06 - Area Check Deck. Key punched and verified from the Area Field Check Record (section 15.12), as described in section 2.52. This deck will be used to prepare Area Table C, as described in section 2.53; and to prepare the Area Photo Stratum Master Deck No. 51 (section 16.52), as described in section 2.531.

The Deck No. 06 will consist of manila-A cards with a K-red top stripe and a top right corner cut.

The description of the Area Check Deck No. 06 is:

Punching Card Columns	Field
1- 2	Deck No.
3- 4	State
5	Subregion
6- 7	Survey Unit
8-11	Blank Columns
	Original Photo Classifications:
12	Land Type
13-14	Local Type
15	Stand Size Class
16-17	Stocking Class
18-25	Blank Columns
	Field Check Classifications:
26	Land Type
27-28	Local Type
29	Stand Size Class
30-31	Stocking Class
32-33	Site
34-80	Blank Columns

X Punches

12 Punches

16.06 No. 07 - Area Work Deck. Reproduced from the Area Sample Deck No. 01 (section 16.01), as described in section 2.542. The field class control items will be gang punched, and the corrected number of photo plots will be calculated using the Area Correction Factor Master Deck No. 52 (section 16.53), as described in section 2.543. This deck will be used to prepare the Area Summary Deck No. 02 (section 16.02), as described in section 2.55.

The Area Work Deck No. 07 will consist of plain manila-A cards with a top right corner cut.

The description of the Area Work Deck No. 07 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-11	Ownership1/
	Original Photo Classifications:
12	Land Type
13-14	Local Type
15	Stand Size Class
16-17	Stocking Class
18-21	Blank Columns
22-25	Number of Photo Plots from Original Photo Classification (0 dec)2/
	Field Check Classifications:
26	Land Type
27-28	Local Type
29	Stand Size Class
32-33	Blank Columns
34-39	Corrected Number of Photo Plots based on Field Check (2 dec)3/

1/ Included as a control item if required.

2/ Number of photo plots of the original photo classification. coded in Col. 12-17 of this deck.

3/ Corrected number of photo plots from the original photo classification number of plots that occur in the field check classification coded in Col. 26-31 of this deck; obtained by multiplying Col. 22-25 by the correction factor in Col. 44-48 of Deck No. 52.

No. 07 (continued)

Punching Card Columns	Field
40-76	Blank Columns
77-78	Field Class Stratum Number
79-80	Final Number of Field Class Strata for the original photo class stratum.

X Punches

64	Control X Punch

12 Punches

65	Control 12 punch

16.1 Volume Detail Decks.

16.1(1) No. 10 - Location Control Deck. Key punched and verified from the heading of the Plot Records (section 15.2(1)), as described in section 5.1. This deck will be used in preparing the Volume Stratum Average Volume per Acre Calculation Master Deck No. 65 (section 16.6(4)), as described in section 6.21; the Location Quality Volume Error Summary Deck No. 49 (section 16.42), as described in section 11.61; the Plot Volume Summary Deck No. 30 (section 16.21), as described in section 13.221; the Volume Stratum Average Growth per Acre Calculation Master Deck No. 85 (section 16.82), as described in section 14.32; and the Location Growth Error Summary Deck No. 39 (section 16.38), as described in section 14.91. The Location Control Deck No. 10 also will be used to prepare Volume Table F, as described in section 6.21.

The Location Control Deck No. 10 will consist of solid color E-green cards with a top right corner cut.

The description of the Location Control Deck No. 10 is:

Deck No. 10

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-13	Location Number
14	Plot Number
15	Land Type
16-17	Local Type
18	Stand Size Class
19-20	Stocking Class
21-22	Major Type1/
23-24	Volume Stratum1/
25-26	Site
27-28	Stand Age
29-31	Stand Height
32-80	Blank Columns

X Punches

40	Control X Punch

12 Punches

41	Control 12 punch

16.1(2) No. 11 - Tree Volume Deck. Reproduced from the Tree Work Deck No. 21 (section 16.1(10)), as described in section 5.31. The cubic foot net and Scribner b.f. woods gross volumes will be calculated for each card using the Merchantability Factor Master Deck No. 64 (section 16.6(3)) for the merchantable ST trees of the indicator species, as described in section 5.321; or using the merchantability factors in the cards no. 11 for all other trees, as described in section 5.322. The Scribner and Int. 1/4" b.f. net volumes will be calculated only for the trees in evenaged young growth ST and PT Stands using the Breakage Factor Master Deck No. 70 (section 16.6(9)) as described in section 13.212, and the Scribner to International 1/4" Ratio Master Deck No. 66 (section 16.6(5)) as described in section 13.213. The Scribner b.f. woods gross volume per acre will be calculated for all trees of the quality species on the odd numbered field locations and the quality sample tree Scribner b.f. woods gross volume per acre will be calculated using the Location Volume Blow Up Master Deck No. 68 (section 16.6(7)), as described in section 11.4.

1/ Included as a control item if required.

The Tree Volume Deck No. 11 will be used to prepare the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 (section 16.1(3)), as described in section 6.1; the Location Mortality Volume Error Summary Deck No. 29 (section 16.1(12)), as described in section 10.11; the Plot Volume Summary Deck No. 30 (section 16.21), as described in section 13.2; and Volume Table V, as described in section 9.2(21).

This deck will consist of plain manila - A cards with a top left corner cut.

The description of the Tree Volume Deck No. 11 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-13	Location Number
14	Plot Number
15	Land Type
16-17	Local Type
18	Stand Size Class
19-20	Stocking Class
21-22	Major Type1/
23-24	Volume Stratum1/
25-26	Tree Number
27	Species Group
28-29	Species
30-31	2" DBH Class
32	10" DBH Group
33-34	Log Height
35	Merchantability Class
36-37	Merchantability Factor 2/
38	Cause of Death
39	Sample Tree
	Tree Gross Volumes:3/
40-44	Cubic Foot (1 dec)
45-48	Scribner Dec. C (0 dec)
49-53	Tree Cubic Foot Net Volume (1 dec)
	Tree Scribner B.F. Volumes (0 dec):
54-58	Woods Gross3/
59-63	Net4/
64-68	Tree Int. 1/4" BF Net Volume4/ (0 dec)

1/ Included as a control item if required.

2/ This is a code for the merchantable ST trees of the indicator species, but is a factor for all other trees.

3/ Punched for each tree.

4/ Calculated and punched only for trees in evenaged young growth sawtimber and poletimber stands. These trees and this volume will be used in the growth compilation.

Deck No. 11 (continued)

Punching Card Columns	Field
69-74	Tree Scribner Board foot woods gross volume per Acre (0 dec)5/
75-80	Quality sample tree Scribner BF woods gross volume per acre (0 dec)6/

X Punches

31	Identifying X punch for trees in 10" DBH group 1.
69	Identifying X punch for merchantable spruce and hemlock ST trees on odd numbered field locations.
76	Identifying X punch for merchantable, spruce and hemlock ST trees on the 1/20 acre sub plot of odd numbered field locations
74	Control X punch
75	Identifying X punch for cards signifying no live merchantable trees on plot; used when one or more plots at a location has live merchantable trees and the other plot(s) have no live merchantable trees.

12 Punches

77	Control 12 punch

16.1(3) No. 12 - Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck. Summary punched from the Tree Volume Deck No. 11 section 16.1(2)), as described in section 6.1. The cubic foot net and Scribner b.f. woods gross average volumes per Acre will be calculated using the Volume Stratum Average Volume per Acre Calculation Master Deck No. 65 (section 16.6(4)), as described in section 6.23. The Scribner b.f. average net volume per acre will be calculated using the Breakage Factor Master Deck No. 70 (section 16.6(9)), as described in section 6.24. The Int. 1/4" b.f. average net volume per acre will be calculated using the Scribner to International 1/4" Ratio Master Deck No. 66 (section 16.6(5)), as described in section 6.25.

5/ Calculated and punched only for trees of the quality species on the odd numbered field locations. The tree volume will be blown up to the per acre level from the 3/5 acre level. This volume will be used in the quality compilation.

6/ Calculated and punched only for quality sample trees on the quality sample plots of odd numbered field locations. The tree volume will be blown up to the per acre level from the 3/20 acre level. This volume will be used in the quality compilation.

The Deck No. 12 will be used to prepare: the Volume Stratum Total Average Net Volume per Acre Master Work Deck No. 13 (section 16.1(4)), as described in section 8.111; the Volume Stratum Species and Diameter Group Total Average Net Volume per Acre and Percent Calculation Deck No. 14X1 (section 16.1(5)), as described in section 8.112; Volume Table K, as described in section 6.31; and Volume Table T, as described in section 9.2(2).

This deck will consist of solid color C-salmon cards with a top left corner cut.

The description of the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit1/
8- 9	Block2/
10	Land Type
11-12	Local Type2/
13	Stand Size Class
14-15	Major Type2/
16-17	Volume Stratum2/
18	Merchantability Class
19	Species Group
20-21	Species
22	10" DBH Group

Punching Card Columns	Field
	Volume Stratum Total Volume:
23-28	Cubic Foot, Net (1 dec)
29-34	Scribner B.F., Woods Gross (0 dec)
	Volume Stratum Average Volumes per Acre (2 dec):3/
35-41	Scribner B.F., Woods Gross
42-48	Cubic Foot, Net
49-55	International 1/4" B.F.,Net
56-62	Scribner B.F., Net
63-80	Blank Columns
	X Punches
74	Control X Punch
	12 Punches
75	Control 12 punch

1/ Not included as a control item in the deck for mortality (MC 7) volume.

2/ Included as a control item if required.

3/ Cubic foot volumes will be calculated for all merchantability classes; MC 1, 2, 3, 7, and 8. Board foot volumes will be calculated only for MC 1, 7, and 8.

16.1(4) No. 13 - Volume Stratum Total Average Net Volume per Acre Master Work Deck. Summary punched from the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 (section 16.1(3)), as described in section 8.111. This deck will be used in the calculation of the species percents of the stratum volume, as described in section 8.121.

The Deck No. 13 will consist of solid color G-Yellow Cards with a top left corner cut.

The description of the Volume Stratum Total Average Net Volume per Acre Master Work Deck No. 13 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit1/
8- 9	Block2/
10-11	Volume Stratum
12	Merchantability Class
13	Kind of Volume
14	Species Group
15-16	Blank Columns
	For each KV Deck except original summary punched deck
17-23	Volume Stratum total average net volume per acre (2 dec)
24-80	Blank columns
	Original Summary Punched Deck
	Volume Stratum total average net volume per acre (2 dec)
17-23	Kind of Volume 3
24-30	Kind of Volume 1
31-37	Kind of Volume 2
38-80	Blank Columns
	X Punches
36	Control X punch
	12 Punches
37	Control 12 punch

1/ Not included as a control item in the deck for MC7.
2/ Included as a control item if required.

16.1(5) No. 14 - Volume Stratum Species and Diameter Group Total Average Net Volume per Acre and Percent Calculation Decks: X1 and NX1.

The Deck No. 14X1 will be summary punched from the Volume Stratum 10" DBH Groups Net Volume per Acre Summary Deck No. 12 (section 16.1(3)), as described in section 8.112. The Deck No. 14NX1 will be reproduced from the Deck No. 14X1, as described in section 8.113. The species percent of the stratum volume will be calculated for the NX1 deck as described in section 8.121. The diameter group percents of the species volumes will be calculated for the NX1 and X1 decks and the percents for groups 4 and 5 will be gang punched into the NX1 deck, as described in section 8.122.

The Deck No. 14NX1 will be used to reproduce the Volume Stratum Species and Diameter Percent Deck No. 16 (section 16.1(7)), as described in section 8.13.

The Deck No. 14X1 will consist of manila-A cards with an S-brown top stripe and a top left corner cut. The Deck No. 14NX1 will consist of plain manila-A cards with a top right corner cut.

The description of the Volume Stratum Species and Diameter Group Total Average Net Volume per Acre and Percent Calculation Decks No. 14NX1 and No. 14X1 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit1/
8- 9	Block2/
10-11	Volume Stratum
12	Merchantability Class
13	Kind of Volume
14	Species Group
15-16	Species

1/ Not included as a control item in the deck for MC7.
2/ Included as a control item if required.

No. 14 (continued)

Punching Card Columns	Field
	Deck No. 14NX1
17-21	Species percent of stratum volume (4 dec)
	Diameter Group Percents of Species Volume (4 dec):
22-26	Group 1
27-31	Group 2
32-36	Group 3
37-41	Group 4
42-46	Group 5
47-53	Species total average net volume per acre (2 dec).
	Diameter Group total average net volumes per acre (2 dec):
54-59	Group 1
60-66	Group 2
67-73	Group 3
74-80	Blank Columns
	X Punches
60	Control X punch
	12 Punches
	Deck No. 14X1
	Diameter group total average net volumes per acre (2 dec):
17-23	Group 4
24-30	Group 5
31-36	Blank columns
	Diameter Group Percents of Species Volume (4 dec):
37-41	Group 4
42-46	Group 5
47-53	Species total average net volume per acre (2 dec).
	Diameter Group total average net volume per Acre (2 dec):
54-59	Group 1
60-66	Group 2
67-73	Group 3
74-80	Blank Columns
	X Punches
1	Identifying X punch
78	Control X punch
	12 Punches
80	Control 12 punch

16.1(6) No. 15 - Volume Stratum Total Volume Master Deck. Summary punched from the Area/Volume Deck No. 03 (section 16.03), as described in sections 7.3 and 8.41. This deck will be used in the species total volume calculation for the Volume Stratum Species and Diameter Percent Deck no. 16 (section 16.1(7)), as described in sections 8.21 and 8.42.

The Deck No. 15 will consist of solid color F-brown cards with a top left corner cut.

The description of the Volume Stratum Total Volume Master Deck No. 15 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit1/
8- 9	Block2/
10-11	Volume Stratum
12	Land Type2/
13-14	Local Type2/
15	Stand Size Class2/
16	Merchantability Class
17	Kind of Volume
18	Species Group
19-26	Stratum Total volume, M Ft (0 dec) (in the deck for each merchantability class)
27-80	Blank columns (in the deck for each merchantability class except MC1; and blank columns in the Deck No. 15X1).
	MC 1 Deck only (except Deck No. 15X1).
	Stratum total volumes, M ft (0 dec):
19-26	Merchantable
27-34	Sound cull
35-42	Rotten cull
43-50	Salvable Dead
51-80	Blank Columns
	X Punches
1	Identifying X punch for the Deck No. 15 containing only the merchantable total net volume, Scribner, summarized at the Block level.
2	Identifying X punch in the deck containing mortality volume only, which will be summarized at the subregion level.
25	Control X punch
	12 Punches
73	Control 12 punch.

1/ Not included as a control item in the deck for MC7
2/ Included as a control item if required

16.1(7) No. 16 - Volume Stratum Species and Diameter Percent Deck. Reproduced from the Volume Stratum Species and Diameter Group Total Average Net Volume per Acre and Percent Calculation Deck No. 14NX1 (section 16.1(5)) for all volume strata except the non sampled strata, and key punched and verified from the Table of Species and Diameter Group Percents for Non Sampled Strata (section 15.28), as described in section 8.13. The Deck No. 16X1 will be reproduced from the Deck No. 16, as described in section 8.42. The species total volume will be calculated using the Volume Stratum Total Volume Master Deck No. 15 (section 16.1(6)), as described in sections 8.21 and 8.42.

The Deck No. 16 will be used in preparing the Volume Stratum Species and Diameter Volume Deck No. 17 (section 16.1(8)), as described in section 8.22.

Deck No. 16 will consist of manila-A cards with an M-blue top stripe and a top right corner cut.

The description of the Volume Stratum Species and Diameter Percent Deck No. 16 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit1/
8- 9	Block2/
10-11	Volume Stratum
12	Land Type
13-14	Local Type2/
15	Stand Size Class2/
16	Merchantability Class
17	Kind of Volume
18	Species Group
19-20	Species
21-25	Species percent of stratum volume (4 dec)

Punching Card Columns	Field
	Diameter Group percents of species volume (4 dec):
26-30	Group 1
31-35	Group 2
36-40	Group 3
41-45	Group 4
46-50	Group 5
51-57	Species total volume, M Ft.
58-80	Blank Columns
	X Punches
1	Identifying X punch for the Deck No. 16 containing the merchantable total net volume, Scribner, calculated at the Blank level.
71	Control X punch
	12 Punches
72	Control 12 punch

1/ Not included as a control item in the deck for MC7.
2/ Included as a control item if required.

16.1(8) No. 17 - Volume Stratum Species and Diameter Volume Deck. Reproduced from the Volume Stratum Species and Diameter Percent Deck No. 16 (section 16.1(7)), as described in section 8.22. The diameter group volumes will be calculated using the Deck No. 16, as described in section 8.22.

The Deck No. 17 will be used to prepare the Species and Diameter Group Total Cubic, Sawlog Cubic, and Upper Stem Cubic Volume Deck No. 23 (section 16.1(11), as described in section 8.3; and to prepare part of the volume summary tabulations described in section 9.1.

Deck No. 17 will consist of manila-A cards with an L-salmon top stripe and a top left corner cut.

The description of the Volume Stratum Species and Diameter Volume Deck No. 17 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit1/
8- 9	Block2/
10-11	Volume Stratum
12	Land Type2/
13-14	Local Type2/
15	Stand Size Class2/
16	Merchantability Class
17	Kind of Volume
18	Species Group
19-20	Species
21-27	Species Total volume, M ft. (0 dec)
	Diameter Group Total Volumes, M ft (0 dec):
28-32	Group 1
33-38	Group 2
39-44	Group 3
45-50	Group 4
51-56	Group 5
57-77	Blank Columns
78-80	Decimal Accumulation
	X Punches
63	Control X punch
	12 Punches
64	Control 12 punch

1/ Not included as a control item in the deck for MC 7.
2/ Included as a control item if required.

16.1(9) No. 20 - Location Merchantable Volume Error Summary Deck. Reproduced from the Location Mortality Volume Error Summary Deck No. 29 (section 16.1(12)), as described in section 10.12. The location volumes per acre and volumes per acre squared will be calculated as described in section 10.21.

The Deck No. 20 will be used to prepare Volume Error Table C, as described in section 10.313.

This deck will consist of solid color B-red cards with a top left corner cut.

The description of the Location Merchantable Volume Error Summary Deck No. 20 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-13	Location Number
14	Land Type
15-16	Local Type1/
17	Stand Size Class
18-19	Stocking Class1/
20-21	Major Type1/
22-23	Volume Stratum1/
	Location Total Merchantable Volumes
	Cubic foot - net:
24-28	PT (1 dec)
29-34	ST (1 dec)
35-40	PT + ST (1 dec)
41-45	PT + ST on per acre basis (0 dec)
	Scribner BF - Woods Gross (0 dec):
46-50	ST on tree basis
51-56	ST on per acre basis

Punching Card Columns	Field
	Location Total Volumes on per Acre basis - squared (0 dec):
57-66	Cubic Foot PT + ST
67-78	Scribner BF ST
79-80	Blank Columns
	X Punches
71	Control X punch
	12 Punches
57	12 punch signifying cubic foot PT+ST volume was squared correctly.
67	12 punch signifying Scribner BF ST volume was squared correctly
70	Control 12 punch

1/ Included as a control item if required.

16.1(10) No. 21 - Tree Work Deck. Key punched and verified from the Plot Record (section 15.21), as described in section 5.21. The tree volumes, species group, and 10" DBH group will be gang punched using the Volume Table Master Deck No. 62 (section 16.6(2)), as described in section 5.22.

The Deck No. 21 will be used to prepare: the Tree Volume Deck No. 11(section 16.1(2)), as described in section 5.31; the Log Volume Deck No. 40 (section 16.41), as described in section 11.31; and the Tree Growth Deck No. 31 (section 16.31), as described in section 14.21.

This deck will consist of plain manila-A cards with a top left corner cut.

The description of the Tree Work Deck No. 21 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-13	Location Number
14	Plot Number
15	Land Type
16-17	Local Type
18	Stand Size Class
19-20	Stocking Class
21-22	Major Type1/
23-24	Volume Stratum1/
25-26	Tree Number
27	Species Group
28-29	Species
30-31	2" DBH Class
32	10" DBH Group
33-34	Log height
35	Merchantability Class
36-37	Merchantability factor2/
38	Cause of death

1/ Included as a control item if required.
2/ This is a code for the merchantable ST trees of the indicator species, but is a factor for all other trees.

Deck No. 21 (continued)

Punching Card Columns	Field
39-41	1/10" DBH Class (1 dec)3/
42-44	5 year diameter growth (1 dec)3/
45-47	10 year diameter growth (1 dec)3/
48-50	Double bark thickness (1 dec)3/
51	Sample tree code4/
	Log Grade and log merchantability factor by log position5/
52	Grade, position 1 (or position 6)
53-55	Merch. Factor, position 1 (or position 6) (2 dec)
56	Grade, position 2 (or position 7)
57-59	Merch. factor, position 2 (or position 7) (2 dec)
60	Grade, position 3 (or position 8)
61-63	Merch. factor, position 3 (or position 8) (2 dec)
64	Grade, position 4 (or position 9)
65-67	Merch. factor, position 4 (or position 9) (2 dec)
68	Grade, position 5 (or position 10)
69-71	Merch factor, position 5 (or position 10)(2 dec)
72-76	Tree Cubic foot gross volume (1 dec)
77-80	Tree Scribner Dec. C gross volume

3/ Present only for live merchantable trees on growth sample plots.

4/ Sample tree codes:

0- Any live tree (S/S, PT, or ST) that is not a quality sample tree

1- Merchantable ST Spruce or Hemlock tree that is a quality sample tree, on an odd numbered field location. Cards with this code contain the quality log data for log positions 1 through 5 in columns 52-71.

2- Merchantable ST Spruce or Hemlock tree with 6 or more logs that is a quality sample tree on an odd numbered field location. Two cards will be punched for these trees. The cards with this code contain the quality log data for log positions 6 through 10 in columns 52-71.

7- Mortality PT or ST tree.

8- Salvable dead PT or ST tree.

9- No live merchantable trees on the plot.

5/ Present only for merchantable ST Spruce or hemlock on the quality sample sub plot position of the odd numbered field locations. Cards with sample tree code 1 have log quality data for positions 1 through 5 in columns 52-71, and cards with sample tree code 2 have log quality data for positions 6 through 10 in columns 52-71.

X Punches

31	Identifying X punch for trees in 10" DBH group 1.
77	Identifying X punch for cards signifying no live merchantable trees on plot; used when one or more plots at a location has live merchantable trees and the other plot(s) have no live merchantable trees.
79	Control X punch

12 Punches

80	Control 12 punch

16.1(11) No. 23 - Species and Diameter Group Total Cubic, Sawlog Cubic, and Upper Stem Cubic Volume Deck. Reproduced from the Volume Stratum Species and Diameter Volume Deck No. 17 (section 16.1(8)), as described in section 8.3. The sawlog, upper stem, and hardwood limbwood cubic volumes will be calculated using the Sawlog Cubic Volume Factor Master Deck No. 69 (section 16.6(8)), as described in section 8.3.

The Deck No. 23 will be used to prepare part of the volume summary tabulations, as described in section 9.1.

This deck will consist of plain manila - A cards with a top right corner cut.

The description of the Species and Diameter Group Total Cubic, Sawlog Cubic, and Upper Stem Cubic Volume Deck No. 23 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block1/
10-11	Volume Stratum
12	Land Type1/
13-14	Local Type1/
15	Stand Size Class1/
16	Merchantability Class
17	Kind of Volume
18	Species Group
19-20	Species
21	10" DBH Group

Punching Card Columns	Field
	10" DBH Group Total Net Volumes, M Ft - Cubic:
22-27	Total
28-33	Sawlog
34-39	Upper Stem
40-45	Hardwood Limbs
46-80	Blank Columns
	X Punches
52	Control X punch
	12 Punches
53	Control 12 punch

1/ Included as a control item if required.

16.1(12) No. 29 - Location Mortality Volume Error Summary Deck. Summary punched from the Tree Volume Deck No. 11 (section 16.1(2)), as described in section 10.11. The location mortality volumes will be raised to the 10 year one acre level and squared as described in section 10.22. This deck will be used to prepare the Location Merchantable Volume Error Summary Deck No. 20 (section 16.1(9)), as described in section 10.12; and the Mortality Error Table B, as described in section 10.322.

The Deck No. 29 will consist of solid color C- salmon cards with a top right corner cut.

The description of the Location Mortality Volume Error Summary Deck No. 29 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-13	Location Number
14	Land Type
15-16	Local Type1/
17	Stand Size Class
18-19	Stocking Class1/
20-21	Major Type1/
22-23	Volume Stratum1/
	Location Total Volumes:
	Merchantable - Cubic Foot, Net (1 dec):
24-28	PT
29-34	ST
35-40	PT + ST
	Merchantable - Scribner BF, Woods gross:
41-45	ST
	5 Year Mortality - Cubic Foot Net (1 dec)
46-50	PT
51-56	ST
57-62	PT + ST
63-68	10 Year Mortality - PT + ST, on per acre basis (0 dec)
69-80	10 Year Mortality - PT + ST on per acre basis - squared (0 dec)
	X Punches
78	Control X punch
	12 Punches
69	12 punch signifying 10 year mortality volume - PT + ST on per acre basis - was squared correctly.
80	Control 12 punch.

1/ Included as a control item if required.

16.2 Growth Detail Decks - Yield Table Method.

16.21 No. 30 - Plot Volume Summary Deck. Summary punched from the EA-YG Tree Volume Deck No. 11 (section 16.1(2)), and gang punched from the Location Control Deck No. 10 (section 16.1(1)), as described in section 13.221. The plot net volumes per acre will be calculated using the Location Volume Blow Up Deck No. 68 (section 16.6(7)), as described in section 13.222. The plot annual increments per acre will be gang punched using the Yield Table Master Deck No. 80 (section 16.71), as described in section 13.3.

This Deck No. 30 will consist of solid color C- salmon cards with a top left corner cut.

The description of the Plot Volume Summary Deck No. 30 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-13	Location Number
14	Plot Number
15	Land Type
16-17	Local Type
18	Stand Size Class
19-20	Stocking Class
21-22	Major Type
23-24	Volume Stratum
25-26	Site
27-28	Stand Age
	Plot Merchantable Net Volumes:
	Cubic Foot (1 dec):
29-34	PT
35-40	ST
47-52	International 1/4" BF - ST (0 dec)
	Plot Merchantable Net Volumes per Acre (0 dec):
53-58	Cubic Foot - PT + ST
59-64	International 1/4" BF - ST
	Annual Increment per Acre (0 dec):
65-67	Cubic Foot
68-71	International 1/4" B.F.
72-80	Blank Columns
	X Punches
74	Control X punch
	12 Punches
75	Control 12 punch

16.3 Growth Detail Decks - Tree Method. The decks listed below will be used in the tree method of growth compilation as outlined in section 14. Descriptions for these decks will be prepared if and when they are required.

6.31 No. 31 - Tree Growth Deck. Prepared and used as outlined in sections 14.2, 14.82(23), and 14.91.

16.32 No. 32 - Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck. Prepared and used as outlined in sections 14.3 and 14.4.

16.33 No. 33 - Volume Stratum Total Average Gross Growth per Acre Master Deck. Prepared and used as outlined in sections 14.611-1 and 14.612-1.

16.34 No. 34 - Volume Stratum Species and Diameter Group Gross Growth per Acre and Percent Calculation Decks: NX1 = groups 1, 2, and 3; X1 = groups 4 and 5. Prepared and used as outlined in sections 14.611-2, 14.611-3, 14.612, and 14.613.

16.35 No. 35 - Volume Stratum Total Gross Growth Master Deck. Prepared and used as outlined in sections 14.53 and 14.621.

16.36 No. 36 - Volume Stratum Species and Diameter Percent for Growth Deck. Prepared and used as outlined in sections 14.613 and 14.62.

16.37 No. 37 - Volume Stratum Species and Diameter Gross Growth Deck. Prepared and used as outlined in sections 14.622 and 14.81.

16.38 No 39 - Location Growth Error Summary Deck. Prepared and used as outlined in section 14.9.

16.4 Quality Detail Decks.

16.41 No. 40 - Log Volume Deck. Reproduced from the Tree Work Deck No.21 (section 16.1(10)), as described in section 11.31. The log gross volumes will be calculated using the Percent of Tree Volume by Log Height and Position Master Deck No. 90 (section 16.91) and the log net volumes will be calculated, as described in section 11.32. The log net volumes per Acre will be calculated using the Location Volume Blow Up Master Deck No. 68 (section 16.6(7)), as described in section 11.33.

The Deck No. 40 will be used to prepare FS Table 41 as described in section 11.511 and the Location Quality Volume Error Summary Deck No. 49 (section 16.42), as described in section 11.61.

This deck will consist of plain manila - A cards with a top right corner cut.

The description of the Log Volume Deck No. 40 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-13	Location Number
14	Plot Number
15	Land Type
16-17	Local Type
18	Stand size class
19-20	Stocking Class
21-22	Major Type1/
23-24	Volume Stratum1/
25-26	Tree Number
27	Species Group
28-29	Species
30-31	2" DBH Class
32	10" DBH Group
33-34	Log Height
35	Merchantability Class
36-37	Merchantability factor2/
38-39	Log Position
40	Log Grade
41-43	Log Merchantability Factor
	Scribner Dec. C Volumes:
44-47	Tree - gross
48-51	Log - gross
52-55	Log - net
56-60	Scribner Board Foot log net volume per Acre.
61-80	Blank Columns

X Punches

25	Control X punch

12 Punches

1/ Included as a control item if required.
2/ This is a code for the merchantable ST trees of the indicator species, but is a factor for all other trees.

16.42 No. 49 Location Quality Volume Error Summary Deck. Summary punched from the Log Volume Deck No. 40 (section 16.41) and reproduced from the Location Control Deck No. 10 (section 16.1(1)), as described in section 11.61. The location quality volume per acre will be squared as described in section 11.62. This deck will be used to prepare Quality Error Table B as described in section 11.632.

The Deck No. 49 will consist of solid color D - blue cards with a top left corner cut.

The description of the Location Quality Volume Error Summary Deck No. 49 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Block
10-13	Location Number
14	Land Type
15-16	Local Type1/
17	Stand Size Class
18-19	Stocking Class1/
20-21	Major Type1/
22-23	Volume Stratum1/
24-29	Location Quality Log Volume per Acre, Scribner BF (0 dec)
30-41	Location Quality Log Volume per Acre Squared (0 dec)
42-80	Blank Columns
	X Punches
60	Control X punch
	12 Punches
30	12 punch signifying location quality log volume was squared correctly
61	Control 12 punch

1/ Included as a control item if required.

16.5 Area Master Decks.

16.51 No. 50 - Area Blow Up Master Deck. Key punched and verified from the Table of Area Control Data (section 15.13), as described in section 2.56. The deck will be used in calculating the acres in the Area Summary Deck No. 02 (section 16.02), as described in section 2.57.

The Deck No. 50 will consist of solid color F - brown cards with a top right corner cut.

The description of the Area Blow Up Master Deck No. 50 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8-35	Blank Columns
36-40	Total Number of Photo Plots in Unit (0 dec)
41-48	Total land area of unit, acres (0 dec)
49-56	Area Blow Up Factor for unit (5 dec)
57-80	Blank Columns
	X Punches
60	Control X punch
	12 Punches
61	Control 12 punch

16.52 No. 51 - Area Photo Stratum Master Deck. Summary punched from the Area Check Deck No. 06 (section 16.05), as described in section 2.531. This deck will be used with the Area Sample Deck No. 01 (16.01), as described in section 2.541.

The Deck No. 51 will consist of manila - A cards with an S-brown top stripe and a top left corner cut.

The description of the Area Photo Stratum Master Deck No. 51 is:

Deck No. 51

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8-11	Blank Columns
	Original Photo Classifications:
12	Land Type
13-14	Local Type
15	Stand Size Class
16-17	Stocking Class
18-78	Blank Columns
79-80	Final Number of Field Class strata for the original photo class stratum

X Punches

50	Control X punch

12 Punches

51	Control 12 punch

16.53 No. 52 - Area Correction Factor Master Deck.

Key punched and verified from Area Table C (section 2.633), as described in section 2.532. This deck will be used with the Area Work Deck No. 07 (section 16.06), as described in section 2.543.

The Deck No. 52 will consist of manila - A cards with a K - red top stripe and a top left corner cut.

The description of the Area Correction Factor Master Deck No. 52 is:

Deck No. 52

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8-11	Blank Columns
	Original Photo Classifications:
12	Land Type
13-14	Local Type
15	Stand Size Class
16-17	Stocking Class
18-21	Blank Columns
22-25	Number of Photo Plots from Original Photo Classification (0 dec)1/
	Field Check Classification:
26	Land Type
27-28	Local Type
29	Stand Size Class
30-31	Stocking Class
32-29	Blank Columns
40-43	Field Check Number of Plots (0 dec)2/
44-48	Correction Factor for application to original number of Plots, Deck No. 07. (4 dec)3/
49-76	Blank Columns
77-78	Field Class Stratum Number
79-80	Final Number of Field Class Strata for the Original Photo Class Stratum.

X Punches

60	Control X punch

12 Punches

61	Control 12 punch

1/ Number of Plots of the original photo classification that were field checked.

2/ Number of plots of the original photo classification that occur in the particular field check classification coded in col 26-31 of this deck.

3/ Correction factor = col 40-43 divided by col 22-25.

16.6 Volume Master Decks.

16.6(1) No. 60 - 2" DBH Class and 10" DBH Group Master Deck.

Reproduced from the INT-FS 2" DBH Class and 10" DBH Group Master Deck No. 60 as described in section 3.1. This deck will be used, as required, to gang punch the 2" DBH Classes and the 10" DBH Groups.

The Deck No. 60 will consist of J - natural master cards with a K - red top stripe and a top right corner cut.

The description of the 2" DBH Class and 10" DBH Group Master Deck No. 60 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5-27	Blank Columns
28-29	2" DBH Class1/
30-31	2" DBH Class2/
32	10" DBH Group2/
33-34	1" DBH3/
35	Blank Columns
36-37	1" DBH3/
38	Blank Column
39-40	2" DBH Class3/
41	10" DBH group3/
42-80	Blank Columns
	X Punches
11	Control X punch
	12 Punches
12	Control 12 punch

1/ For use with Deck No. 31.
2/ For use with Decks No. 11, 21, 31, and 40.
3/ For use with Deck No. 31.

16.6(2) No. 62 - Volume Table Master Deck. Key punched and verified from the Tree Volume Tables (section 15.23), as described in section 3.2. This deck will be used with the Tree Work Deck No. 21 (section 16.1(10)), as described in section 5.22.

The Deck No. 62 will consist of J - natural master cards with a V - violet top stripe and a top right corner cut.

The description of the Volume Table Master Deck No. 62 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5-26	Blank Columns
27	Species Group 1/
28-29	Species 1/
30-31	2" DBH Class 1/
32	10" DBH Group 1/
33-34	Log Height 1/
35-38	Blank Columns
39-40	2" DBH Class 2/
41	10" DBH Group 2/
42-47	Blank Columns
	Tree Gross Volumes:
48-52	Cubic foot, (1 dec) 2/
53-56	Scribner Dec. C 2/
57-61	Cubic foot (1 dec) 2/
62-65	Scribner Dec. C 2/
66-71	Blank Columns
72-76	Cubic Foot (1 dec) 3/
77-80	Scribner Dec C 3/
	X Punches
31	Identifying X punch for trees in 10" DBH group 1
44	Control X punch
	12 Punches
45	Control 12 punch

1/ For use with Decks No. 11, 21, and 40.
2/ For use with Deck No. 31.
3/ For use with Deck No. 21.

16.6(3) No. 64 - Merchantability Factor Master Deck. Key punched and verified from the Table of Average Merchantability Factors (section 15.24), as described in section 3.3. This deck will be used with the Tree Volume Deck No. 11 (section 16.1(2)) as described in section 5.321, and with the Tree Growth Deck No. 31 (section 16.31) as described in section 14.261.

The Deck No. 64 will consist of J - natural master cards with an X - gray top stripe and a top right corner cut.

The description of the Merchantability Factor Master Deck No. 64 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5-26	Blank Columns
27	Species Group1/
28-29	Species1/
30-31	2" DBH Class1/
32-34	Blank Columns
35	Merchantability Class1/
36-37	Merchantability Code1/
38-41	Blank Columns
42	Merchantability Class2/
43-44	Merchantability Code2/
45-58	Blank Columns
	Merchantability Factors (2 dec):
59-60	Cubic Foot
61-62	Board Foot
63-80	Blank Columns
	X Punches
39	Control X punch
	12 Punches
40	Control 12 punch

1/ For use with Decks No. 11 and 40.
2/ For use with Deck No. 31.

16.6(5) No. 66 - Scribner to International 1/4" Ratio Master Deck. Key punched and verified from the Table of Scribner to International 1/4 - inch Ratios (section 15.26), as described in section 3.4. This deck will be used with: the Volume Stratum 10" DBH Group net volume per Acre Summary Deck No. 12 (section 16.1(3)), as described in section 6.25; the Tree Volume Deck No. 11 (section 16.1(2)), as described in section 13.213; and the Volume Stratum 10" DBH Group Gross Growth per Acre Summary Deck No. 32 (section 16.32), as described in section 14.36.

The Deck No. 66 will consist of J-natural master cards with a M-blue top stripe and a top right corner cut.

The description of the Scribner to International 1/4" Ratio Master Deck No. 66 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5-18	Blank Columns
19	Species Group1/
20-21	Species1/
22	10" DBH Class1/
23-26	Blank Columns
27	Species Group2/
28-29	Species2/
30-31	Blank Columns
32	10" DBH Group2/
33-68	Blank Columns
69-71	Scribner to International 1/4" Ratio (2 dec)
72-80	Blank Columns
	X Punches
78	Control x punch
	12 Punches
79	Control 12 punch

1/ For use with Deck No. 12
2/ For use with Deck No. 11

16.6(6) No. 67 - Volume Stratum Average Net Volume per Acre Master Deck. Key punched and verified from the Tables of Average Volumes per Acre (section 15.27), as described in section 6.32. This deck will be used with the Area/Volume Deck No. 03 (section 16.03), as described in section 7.2.

The Deck No. 67 will consist of plain J-natural master cards with a top left corner cut.

The description of the Volume Stratum Average Net Volume per Acre Master Deck No. 67 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit1/
8-11	Blank Columns
12	Land Type
13-14	Blank Columns
15	Stand Size Class
16-19	Blank Columns
20-21	Volume Stratum2/
22	Species Group
23	Kind Volume
24-29	Blank Columns
	Average Net Volumes per Acre, feet:3/
30-34	Merchantable, MC14/
35-39	Sound Cull, MC 24/
40-44	Rotten Cull, MC 34/
45-49	Mortality, MC 75/
50-54	Salvable Dead
55-80	Blank Columns
	X Punches
1	Identifying x punch for the deck containing mortality volume (MC7) only, which will be summarized at the subregion level.
	12 Punches
72	Control 12 punch

1/ Not included as a control item in the X1 deck for mortality volume, MC7.
2/ Included as a control item if required.
3/ Cubic foot volumes prepared for all merchantability classes; MC1, 2, 3, 7, and 8. Board foot volumes prepared for MC 1, 7, and 8.
4/ Not included in the X1 deck for mortality volume, MC7.
5/ Not included in the NX1 deck for volume of MC 1, 2, 3, and 8.

16.6(7) No. 68 - Location Volume Blow Up Master Deck. Key punched and verified with the location and plot volume blow up factors from sections 17.2(21), 17.2(22), 17.2(23), 17.2(24), 17.2(35), and 17.2(36), as described in section 3.5. The deck will be used with: the Location Merchantable Volume Error Summary Deck No. 20 (section 16.1(9)), as described in section 10.21; the Location Mortality Volume Error Summary Deck No. 29 (section 16.1(12)), as described in section 10.22; the Log Volume Deck No. 40 (section 16.41), as described in section 11.33; the Tree Volume Deck No. 11 (section 16.1(2)), as described in section 11.4; the Plot Volume Deck No. 30 (section 16.21), as described in section 13.222; and the Location Growth Error Summary Deck No. 39 (section 16.38), as described in section 14.92.

The Deck No. 68 will consist of plain J-natural master cards with a top left corner cut.

The description of the Location Volume Blow Up Master Deck No. 68 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5-62	Blank Columns
	Plot Volume Blow Up Factors (0 dec)
63	PT Factor = 8 1/
64	ST or PT + ST Factor = 5 2/
	Location Volume Blow Up Factors:
	Merchantable Volume
65	PT Factor (0 dec) = 8 3/
66-70	ST or PT+ST Factor (4 dec) = 1.6667 4/
	Mortality Volume
71-75	ST or PT+ST Factor (4 dec) = 3.3334 5/
	Quality Volume
76-80	ST Factor (4 dec) = 6.6667 6/
	X Punches
39	Control X punch
	12 Punches
40	Control 12 punch

1/ To convert PT volume on 1/40 acre to volume on 1/5 acre for growth error.

2/ To convert PT+ST volume on 1/5 acre to volume on 1 acre for growt error.

3/ Used also for mortality PT. To convert PT volume on 3/40 acre to volume on 3/5 acre.

4/ To convert volume on 3/5 acre to volume on 1 acre.

5/ To convert 5 yr mortality volume on 3/5 acre to 10 yr volume on 1 acre.

6/ To convert volume on 3/20 acre to volume on 1 acre.

16.6(8) No. 69 - Sawlog Cubic Volume Factor Master Deck. Key punched and verified from the Table of Sawlog Cubic Volume Factors (section 15.29), as described in section 3.6. This deck will be used with the Species and Diameter Group Total Cubic, Sawlog Cubic, and Upper Stem Cubic Volume Deck No. 23 (section 16.1(11)), as described in section 8.3.

The Deck No. 69 will consist of plain J-natural master cards with a top left corner cut.

The description of the Sawlog Cubic Volume Factor Master Deck No. 69 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion1/
6- 7	Survey Unit1/
8-15	Blank Columns
16	Merchantability Class1/
17	Kind of Volume
18	Species Group
19-20	Species
21	10" DBH Group
22-45	Blank Columns
	Factors:
46-47	Total Cubic to Sawlog Cubic (2 dec)
48-51	Sawlog Cubic to Hardwood Limbs (4 dec).
52-80	Blank Columns
	X Punches
63	Control X Punch
	12 Punches
64	Control 12 punch

1/ Included as a control item if required.

16.6(9) No. 70 - Breakage Factor Master Deck. Key punched and verified from the Table of Breakage Factors (section 15.25), as described in section 3.7. The deck will be used with the Volume Stratum 10" DBH Group Net Volume per Acre Summary Deck No. 12 (section 16.1(3)), as described in section 6.24; and with the Tree Volume Deck No. 11 (section 16.1(2)), as described in section 13.212.

The Deck No. 70 will consist of J-natural master cards with a W-rose top stripe and a top right corner cut.

The description of the Breakage Factor Master Deck No. 70 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion
6- 7	Survey Unit
8- 9	Blank Columns
10	Land Type 1/
11-14	Blank Columns
15	Land Type 2/
16-17	Blank Columns
18	Merchantability Class 1/
19	Species Group 1/
20-21	Species 1/
22-26	Blank Columns
27	Species Group 2/
28-29	Species 2/
30-34	Blank Columns
35	Merchantability Class 2/
36-68	Blank Columns
69-71	Breakage Factor (2 dec) 3/
72-80	Blank Columns
	X Punches
50	Control X punch
	12 Punches
51	Control 12 punch

1/ For use with Deck No. 12.
2/ For use with Deck No. 11.
3/ For application to Scribner B.F. woods gross volume.

16.6(10) No. 71 - Volume Conversion Factor Master Deck. Key punched, verified, reproduced, and calculated as described in section 3.8. The deck will be used with the Volume Stratum Average Volume per Acre Calculation Master Deck No. 65 (section 16.6(4)), as described in section 6.22.

The Deck No. 71 will consist of J-natural master cards with a P-green top stripe and a top left corner cut.

The description of the Volume Conversion Factor Master Deck No. 71 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5-21	Blank Columns
22	10" DBH Group
23-52	Blank Columns
53-55	Number of Plots Sampled
56-62	Blank Columns
63-70	Conversion Factor (5 dec)
71-76	Total Acres Sampled (3 dec)
77-79	Individual Plot Size (3 dec).
80	Blank Column
	X Punches
60	Control X Punch
	12 Punches
62	Control 12 Punch
52	12 Punch signifying the total acres sampled was correctly calculated (present only if proved on calculator).
57	12 Punch signifying the conversion factor was correctly calculated.

16.7 Growth Master Decks - Yield Table Method.

16.71 No. 80 - Yield Table Master Deck. Key punched and verified from the Yield Tables (section 15.31), as described in section 13.1. The deck will be used with the Plot Volume Summary Deck No. 30 (section 16.21), as described in section 13.3.

The Deck No. 80 will consist of plain J-natural master cards with a top right corner cut.

Deck No. 80

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5	Subregion1/
6-24	Blank Columns
25-26	Site
27-28	Stand Age
29-64	Blank Columns
	Annual Increment per Acre (0 dec):
65-67	Cubic Foot
68-71	Int. 1/4" B.F.
72-80	Blank Columns

X Punches

80	Control X punch

12 Punches

79	Control 12 punch

16.8 Growth Master Decks - Tree Method. The master decks listed below will be used in the tree method of growth compilation as outlined in section 14. Descriptions for these decks will be prepared if and when they are required.

16.81 No. 80 - 1/10" DBH Volume Table Master Deck. Prepared and used as outlined in sections 14.11 and 14.24.

16.82 No. 85 - Volume Stratum Average Growth per Acre Calculation Master Deck. Prepared and used as outlined in sections 14.32, 14.33, and 14.34.

16.83 No. 87 - Volume Stratum Average Gross Growth per Acre Master Deck. Prepared and used as outlined in sections 14.4 and 14.52.

16.84 No. 89 - Growth Conversion Factor Master Deck. Prepared and used as outlined in sections 14.12 and 14.33.

1/ Included as a control item if required.

16.9 Quality Master Decks.

16.91 No. 90 - Percent of Tree Volume by Log Height and Position Master Deck. Key punched and verified from the Table of Tree Gross Volume Percents by 16' Log Height and 16' Log Position (section 15.51), as described in section 11.2. The deck will be used with the Log Volume Deck No. 40 (section 16.41), as described in section 11.32.

The Deck No. 90 will consist of J-natural master cards with an L-salmon top stripe and a top left corner cut.

The description of the Percent of Tree Volume by Log Height and Position Master Deck No. 90 is:

Punching Card Columns	Field
1- 2	Deck Number
3- 4	State
5-32	Blank Columns
33-34	Log Height
35-37	Blank Columns
38-39	Log Position
40-60	Blank Columns
61-63	Percent of Tree B.F. Gross Volume (2 dec)
64-80	Blank Columns
	X Punches
78	Control X punch
	12 Punches
79	Control 12 punch

IBM CODES

17. CODING AND CODES

17.1 Coding. Each item of data that will be punched into the IBM Cards must be expressed as a numerical code. The code for each item will be entered in the space provided for it in the Data Forms (described in section 15). The codes should be entered in the Data Forms as the data are collected in the field or in the office.

Codes should be entered in the Data Forms in as legible a manner as possible. Incorrect entries should be erased completely and the correct entry made so that it can be read. Do not write one code over another. Pencils of a hardness not to exceed 2H should be used in entering the codes. If harder pencils are used, the codes will be difficult to read and punching errors will be more likely to occur.

The complete code must be entered for each item in the Data Forms. If situations arise that are not provided for in the codes, the IBM Service Unit should be requested to provide a standard method for coding them. Efficient compilation by the IBM method requires the use of standard codes and their entry in the Data Forms in the specified manner.

17.2 Codes. The codes are presented below in alphabetical order of the main items of data. Within each main item, the individual items of data are listed in the numerical order of the code.

The codes for the Alaska Forest Survey by main item of data are:

17.2(1) Accessibility. Commercial forest lands will be classified as being presently accessible and economically available for operation; or as being presently inaccessible and economically unavailable for operation. Accessibility will be coded with Land Type in section 17.2(19).

17.2(2) Acres. Punched as a six-digit number into the Area Cards. Acres will be calculated for each stratum summary by applying the Area Blow Up Factor (section 17.2(3)) to the Number of Dots (section 17.2(13)).

17.2(3) Area Blow Up Factor. Recorded as an eight-digit number (with five decimals) in the Table of Area Control Data for each Survey Unit. The Blow Up Factor will be calculated by dividing the Survey Unit total land area by the total number of dots. The Area Blow Up Factor will be used to convert the stratum dots to acres.

17.2(4) Bark Thickness, Double (DBT). Recorded as a three-digit number (with one decimal) in the Plot Record for each tree in the growth sample, like 010, 037, 105, etc. The Double bark thickness space will be left blank for non growth sample trees.

17.2(5) Block (BL). Recorded as a two-digit code in the Record of Area, the Area Field Check Record, the Table of Area Control Data, the Plot Record, and the Table of Volume Control Data. The block codes will begin with code 01 within each Survey Unit. The code 00 will be used when a Survey Unit has no blocks or when the blocks are not classified for a survey unit. The block codes for the survey units of the Chugach and Interior Subregions will be added later. The block codes by sample unit for the S.E. Alaska subregion are:

1 - Southeast Alaska Subregion

11 - Juneau Unit

01	Taku	05	Skagway
02	East Admiralty	06	Stephens Passage
03	West Admiralty	07	South Admiralty
04	Tracy Arm Port Houghton	08	Lynn Canal

12 - Ketchikan Unit

01	Kosciusko	11	Moira
02	Heceta	12	Union Bay
03	Lulu	13	Cleveland
04	Klawak	14	Behm
05	Exclusion	15	N. E. Revilla
06	Soda Bay	16	Ketchikan
07	Skowl	17	Annette
08	Kasaan	18	S. E. Revilla
09	Sukkwan	19	Boca De Quadra
10	Klakas	20	Portland

13 - Petersburg Unit

01	Farragut	08	Zarembo
02	Thomas	09	Wrangell
03	Bradfield	10	Anita Bay
04	Turnabout	11	Kadake
05	Petersburg	12	Tebenkof
06	Kake	13	Rocky Pass
07	Duncan		

14 - Sitka Unit

01	Port Frederick	07	Peril Straits
02	Fresh Water	08	Kelp Bay
03	Elfin	09	Sitka
04	Tenakee	10	Crawfish
05	Pelican	11	Alexander
06	Hoonah		

15 - Yakutat Unit

01	Yakutat	02	Dry Bay

2 - Chugach Subregion

21 Kenai Unit

22 Prince William Sound Unit

3 - Interior Subregion

30 Susitna - Matanuska Unit

31 Kenai - W. Cook Inlet Unit

32 Tanana - Fairbanks Unit

33 Upper Tanana Unit

34 Copper River Unit

35 Upper Yukon Unit

36 Lower Yukon Unit

37 Kuskokwin Unit

38 Bristol Bay Unit

39 Kotzebue - Norton Sounds Unit

17.2(7) Cause of Death (CD). Recorded as a single-digit code in the Plot Record for each Mortality Tree, and for each entry for no live merchantable trees on the plot. The cause of death codes are:

0	Live trees, merchantable or cull
1	Insects
2	Diseases (including mistletoe)
3	Fire
4	Other (includes suppression, logging injury, and unknown).
5	Windthrow
8	Salvable Dead Trees
9	No live merchantable trees on the plot.

17.2(8) DBH - 1/10 inch. Recorded as a three-digit number in the Plot Record for each live merchantable tree on the growth plots, like 074, 108, 437, etc. The 1/10" DBH space will be left blank for the other trees on growth sample plots; and for all trees on non growth sample plots.

17.2(9) DBH - 2" Class. Recorded as a two-digit code in the Plot Record for each tree on the plot, in the Tree Volume Tables, and in the Tables of Average Merchantability Factors. The 2" DBH classes by 1/10" DBH classes are:

02	1.0" to 2.9" dbh	34	33.0" to 34.9"	66	65.0" to 66.9"
04	3.0" to 4.9"	36	35.0" to 36.9"	68	67.0" to 68.9"
06	5.0" to 6.9"	38	37.0" to 38.9"	70	69.0" to 70.9"
08	7.0" to 8.9"	40	39.0" to 40.9"	72	71.0" to 72.9"
10	9.0" to 10.9"	42	41.0" to 42.9"	74	73.0" to 74.9"
12	11.0" to 12.9"	44	43.0" to 44.9"	76	75.0" to 76.9"
14	13.0" to 14.9"	46	45.0" to 46.9"	78	77.0" to 78.9"
16	15.0" to 16.9"	48	47.0" to 48.9"	80	79.0" to 80.9"
18	17.0" to 18.9"	50	49.0" to 50.9"	82	81.0" to 82.9"
20	19.0" to 20.9"	52	51.0" to 52.9"	84	83.0" to 84.9"
22	21.0" to 22.9"	54	53.0" to 54.9"	86	85.0" to 86.9"
24	23.0" to 24.9"	56	55.0" to 56.9"	88	87.0" to 88.9"
26	25.0" to 26.9"	58	57.0" to 58.9"	90	89.0" to 90.9"
28	27.0" to 28.9"	60	59.0" to 60.9"	92	91.0" to 92.9"
30	29.0" to 30.9"	62	61.0" to 62.9"	94	93.0" to 94.9"
32	31.0" to 32.9"	64	63.0" to 64.9"	96	95.0" to 96.9"
				98	97.0" to 98.9"
				99	No live merchantable trees on the Plot

17.2(10) DBH - 10" Group. Recorded as a single-digit code in the Tree Volume Tables, the Table of Scribner to International Ratios, the Table of Species and Diameter Group Percents for Non Sampled Strata, and the Table of Sawlog Cubic Volume Factors. Also gang punched into each tree card, and into other summary and master cards as required. The 10" DBH group codes are:

0	0.0" to 4.9" DBH	Seedlings and Saplings
1	5.0" to 10.9" DBH	Poletimber
2	11.0" to 20.9" DBH	Small Sawtimber
3	21.0" to 30.9" DBH	Medium Sawtimber
4	31.0" to 40.9" DBH	Large Sawtimber
5	41.0" DBH and over	Very Large Sawtimber
9	No live merchantable trees on the plot.	

17.2(11) Defect Class or Percent. See Merchantability Factor, section 17.2(30).

17.2(12) Diameter Growth, 0-5 Years and 0-10 Years. Recorded as a three-digit number (with one decimal) in the Plot Record for each live merchantable tree on the growth plots, separately for 0-5 years and 0-10 years, like 010, 027, 105, etc. The diameter growth spaces will be left blank for non growth sample trees.

17.2(13) Dots (Photo Plots) Number of. Recorded as a four-digit number in the Record of Area for each stratum entry, like 0008, 0073, 0864, 1721, etc. The number of dots will be summarized to the block level by stratum before recording..

17.2(14) Growth, Average per Acre. The cubic foot, International 1/4" b.f., and the Scribner b.f. average gross growth per acre will be recorded in the Table of 10 Year Average Growth per Acre as five-digit numbers with no decimals.

17.2(15) Growth Conversion Factor, Average per Acre. The factors for converting the LT/SSC stratum total gross volume increment on a tree basis to average gross volume increments per acre will be calculated as eight-digit numbers, with five decimals, in the Growth Conversion Factor Master Deck No. 89. These factors will be calculated by multiplying the total number of 1/5-acre plots, on which growth may be sampled by the acreage on which a 10" DBH group is sampled on an individual sub plot; and calculating the reciprocal of the result.

The growth plot sizes by 10" DBH group are:

10" DBH Group	Range of Diameters	Plot Size	Plot Multiplier
1	5.0" to 10.9" DBH	1/2000 Acre	0.005
2,3,4	11.0" to 40.9" DBH	1/20 Acre	0.050
5	41.0" DBH and over	1/5 Acre	0.200

17.2(16) Growth or Ingrowth. Gang punched as a single-digit code into each tree growth card and into each growth summary card as required. The growth/ingrowth codes are:

For use in Tree Growth Cards

1 Main growth tree for sawtimber; DBH 10 years ago is 11.0" and over.
2 Ingrowth tree for sawtimber; DBH 10 years ago is 10.9" or less and present DBH is 11.0" and over.

3 Main growth tree for poletimber; DBH 10 years ago is 5.0" and over and present DBH is 5.0" to 10.9".
4 Ingrowth tree for poletimber; DBH 10 years ago is 4.9" or less and present DBH is 5.0" to 10.9".

For use in Other Growth Cards

5 Growth, sawtimber and poletimber
6 Ingrowth, sawtimber and poletimber
7 Growth and ingrowth, sawtimber and poletimber

17.2(17) Height, Log. Recorded as a two-digit code in the Plot Record for each tree on the plot, like 00, 01, 07, 10, etc. Log height will be recorded as the number of 16 foot logs to the merchantable top d.i.b. for all softwood sawtimber trees; and as the number of 8 foot logs for all hardwood sawtimber trees. For all sawtimber trees with broken or missing tops, the log height will be tallied corresponding to what the merchantable height is estimated to have been before the top disappeared. Log height will be recorded Code 01 for all poletimber trees. The code 00 will be recorded for all seedling/saplings trees. The code 99 will be used for the entry for no live merchantable trees on the plot. Log height also will be recorded as a two-digit code in the Tree Volume Tables and the Table of Tree Gross Volume Percents by 16' Log Height and 16' Log Position.

The log height codes are:

Seedling/Sapling
00. all seedling/sapling trees

Poletimber, softwood and hardwood
01 all poletimber trees

Sawtimber
Softwood - Actual number of 16' logs to merchantable top d.i.b.
Hardwood - Actual number of 8' logs to merchantable top d.i.b.

No. Live Merchantable Trees
99 No live merchantable trees on the plot.

17.2(18) Kind of Volume (KV). Recorded as a single-digit code in the Table of Average Volumes per Acre, the Table of Species and Diameter Group Percents for non Sampled Strata and Table of Sawlog Cubic Volume Factors. Gang punched into volume and growth tree cards, summary cards, and master cards as required.

The kind of volume codes are:

1 International 1/4-inch board foot.
2 Scribner board foot
3 Total Cubic foot
4 Sawlog Cubic foot

17.2(19) Land Type (LT). Recorded as a single-digit code in the Record of Area for each stratum entry; in the Area Field Check Record for each photo plot checked; in the Plot Record for each plot; and in the Table of Area Control Data, the Table of Volume Control Data, the Table of Breakage Factors, the Table of Average Volumes per Acre, the Table of Species and Diameter Group Percents for non Sampled Strata, and the Table of 10 Year Average Growth per Acre.

The land type codes are:

0 Commercial forest land, inaccessible.
1 Commercial forest land, accessible.
2 Noncommercial forest land, unproductive/unreserved.
3 Nonforest land, unreserved.
4 Noncommercial forest land, productive/reserved.
5 Noncommercial forest land, unproductive/reserved
6 Nonforest land, reserved
7 Water areas between Survey minimum area and 40 acres (census minimum area), unreserved
8 Water areas between Survey minimum area and 40 acres (census minimum area), reserved
9 Water areas over 40 acres in size, unreserved or reserved.

17.2(20) Location/Plot Number. Recorded as a five-digit code in the Plot Record for each sample plot. The first four digits are the location number. This is the number assigned to each photo plot at the time of photo interpretation. Ploto plot location numbers will run consecutively from 0001 in each Survey unit. The volume sample field locationsdo not include all of the photo plots, but their numbers will be consecutive for every nth photo plot.

The single-digit plot number is the last digit of the location/plot number. It will be separated from the location number by a dash. The three volume sample plots at each field location will be numbered individually: 1, 2, or 3.

The complete Location/Plot number will be recorded like 0001-1; 0001-2; 0001-3; etc.

17.2(21) Location Mortality Volume Blow Up Factor. Punched as a five-digit number (with four decimals) into the Location Volume Blow Up Master Card. The location mortality volume blow up factor will be applied to the 5 year PT+ST mortality volume on 3/5 of an acre to convert this volume to the per acre basis for a 10 year period, for use in the mortality volume error calculation. The location mortality volume blow up factor is 3.3334.

17.2(22) Location Poletimber Volume Blow Up Factor. Punched as a single-digit number (with no decimals) into the Location Volume Blow Up Master Card. The location poletimber volume blow up factor will be applied to the live or mortality PT volume on 3/40 acre to blow it up to the ST level on 3/5 acre, for use in the volume error calculation. The location poletimber volume blow up factor is 8.

17.2(23) Location Sawtimber Volume Blow Up Factor. Punched as a five-digit number (with four decimals) into the Location Volume Blow Up Master Card. The location sawtimber volume blow up factor will be applied to the live ST and/or PT+ST volume on 3/5 acre to blow it up to the 1 acre level, for use in the volume error calculation. The location sawtimber volume blow up factor is 1.6667.

17.2(24) Location Sawtimber Quality Volume Blow Up Factor. Punched as a five-digit number (with four decimals) into the Location Volume Blow Up Master Card. The location sawtimber quality volume blow up factor will be applied to the ST quality volume on 3/20 acre to blow it up to the 1 acre level, for use in the quality compilation. The location sawtimber quality volume blow up factor is 6.6667.

17.2(25) Log Grade by Log Position. Recorded as a single-digit code in the Plot Record for each quality log of each merchantable sawtimber Western hemlock and Sitka spruce tree on the quality sample sub plots.

Space is provided in the Plot Record for recording up to 4 quality logs for each tree. If a tree has more than 4 quality logs, use two lines, recording logs 5 and up on the second line.

A log grade code must be entered for each log in the tree that is below a quality log, in position, including cull logs. An entry also must be made in log position 1 for each merchantable hemlock and spruce sawtimber tree that is on the quality sub plot but that does not have a quality log. The code 9 will be entered in the proper position for cull logs, and position 1 for the quality sample trees that have no quality logs.

Trees that fork below the top of the first 16 foot log will be treated as two trees with log grades recorded for each stem. Trees that fork above the top of the first 16 foot log will be treated as one tree with log grades recorded for the longest stem.

No entries will be made for merchantable sawtimber trees of species other than hemlock and spruce that are on the quality sub plots. No entries will be made for saplings and poletimber trees of all species that are on the quality sub plots. Likewise, no entries will be made for any cull or dead trees on the quality sub plots, and no entries will be made for any trees that are off the quality sub plots.

The log grade codes by species are:

Western Hemlock

1	No. 1 logs 1/	3	No. 3 logs
2	No. 2 logs	6	Peeler grade logs 1/

Sitka Spruce

0	Select sawmill logs 1/
1	No. 1 sawmill logs 1/
2	No. 2 sawmill logs
3	No. 3 sawmill logs
6	Peeler grade logs

Both of the above Species

9 Cull logs, logs missing because of a broken top, and trees with no quality logs (recorded in position 1 with no entries for other positions).

Species and trees not graded on the quality sub plots, and all trees off the quality sub plots will have no entries made for log grade by log position.

17.2(26) Log Merchantability Factor (LMF). Recorded as a three-digit number (with two decimals) in the Plot Record for each log that is recorded for each merchantable sawtimber Western hemlock and Sitka spruce tree on the quality sub plots; except that nothing will be recorded for the entry indicating no quality logs for a tree of these species. Nothing will be recorded for the logs of these trees that are not graded; and nothing will be recorded for trees that are not in the quality sample. The board foot log merchantability factor is the compliment of the log defect percent and will be recorded like 100, 085, 050, 000; with 100 indicating 100 percent merchantable and 000 indicating 0 percent merchantable.

1/ These are the quality grades for hemlock and spruce.

17.2(27) Log Percent of Tree Gross Volume. Recorded as a three-digit number (with two decimals) in the Table of Tree Gross Volume Percents by 16' Log Height and 16' Log Position, like 100, 065, etc. The log percents will be used to calculate the board foot gross volume of each graded log of trees of the quality sample.

17.2(28) Major Wood Class (MWC). Gang punched as a single-digit code as required for tree volume and summary cards. The major wood class codes are:

1 Live softwood of sawtimber size, 11.0" DBH and over.
2 Live softwood of poletimber size, 5.0" to 10.9" DBH
3 Live softwood of seedling/sapling size, 4.9" DBH and under
4 Live hardwood of sawtimber size, 11.0" DBH and over
5 Live hardwood of poletimber size, 5.0" to 10.9" DBH
6 Live hardwood of seedling/sapling size, 4.9" DBH and under
7 Mortality trees
8 Salvable dead trees
9 No live merchantable trees on the plot.

17.2(29) Merchantability Class (MC). Recorded as a single-digit code in the Plot Record for each live poletimber and sawtimber tree, and for each entry for no live merchantable trees on the plot. Punched for each tree on the Plot Record, and gang punched as required into volume summary and master cards. Recorded also in the Table of Average Merchantability Factors, the Table of Breakage Factors, the Table of Species and Diameter Group Percents for Non Sampled Strata, and the Table of Sawlog Cubic Volume Factors; and punched as a special code in the Volume Stratum Average Volume per Acre Calculation Master Deck No. 65.

The merchantability class codes are:

Regular Codes

0		5	
1	Merchantable trees	6	
2	Sound cull trees	7	Mortality trees
3	Rotten cull trees	8	Salvable Dead trees
4		9	No live merchantable trees on the plot.

Special Codes for Deck No. 65.

1 Live and salvable dead volume; includes MC1, 2, 3, and 8
7 Mortality volume; includes MC7

17.2(30) Merchantability Code/Factor, Tree (MF).

Codes

The merchantability codes will be recorded as two-digit codes in the Plot Record for each merchantable sawtimber Western hemlock, Sitka spruce, Western redcedar, and Alaska cedar tree. These codes also will be recorded in the Table of Average Merchantability Factors. The merchantability codes are:

00 No defect indicators
01 Defect indicators on either the upper or lower bole.
02 Defect indicators on both the upper and lower bole.

Factors

The merchantability factors, the compliments of the estimated defect percents, will be recorded as two digit numbers (with two decimals) in the Plot Records for each tree; live or dead, poletimber or sawtimber; except for live merchantable sawtimber western hemlock, Sitka spruce, western redcedar, and Alaska cedar trees, for which merchantability codes will be used. Merchantability factors for merchantable poletimber and all live cull trees will be in terms of sound cubic foot volume. Merchantability factors for merchantable sawtimber (other than the indicator species) and for mortality and salvable dead trees will be in terms of sound board foot volume. Merchantability factors of 00 will be recorded for each sapling tree and for cull or mortality trees that are 100 percent defective. The merchantability factors also will be recorded in the Table of Average Merchantability Factors for each 2" DBH class/merchantability code of each indicator species. The factors in these tables, for use with merchantable sawtimber trees of the indicator species, will be in terms of sound cubic foot and board foot volumes.

The merchantability factors will be recorded like 85, 40, 00, etc. The code 99 will be recorded for each tree that is 99% or 100% merchantable. The code 99 also will be recorded for plots with no live merchantable PT or ST trees.

17.2(31) National Forest Administrative Region. Recorded as a two-digit code where required. The NFS Region codes are:

01 Region 1, Northern
02 Region 2, Rocky Mountain
03 Region 3, Southwestern
04 Region 4, Intermountain
05 Region 5, California
06 Region 6, Pacific Northwest
07 Region 7, Eastern
08 Region 8, Southern
09 Region 9, North Central
10 Region 10, Alaska
11 Tropical Region

17.2(32) Ownership. Recorded as a two-digit code where required. The ownership codes are:-

Federal

01 National Forest, unreserved
02 National Parks and Monuments, reserved
03 Indian Lands, (tribal lands and trust allotments but not patented lands), unreserved
04 Bureau of Land Management, unreserved
05
06 Other Federal, unreserved
07 National Forest, reserved
08 Other Federal, reserved

State (Territorial)

11 State, unreserved
17 State, reserved

County and Municipal

21 County and municipal, unreserved
27 County and municipal, reserved

Private, unreserved

30 All private (for use when the information for codes 31, 32, and 41 is not available).
31 Industrial
32 Other private
41 Farm

Unknown

99 Any area or data for which ownership is not known or classified.

17.2(33) Percents, Species and Diameter Group. Recorded as five-digit numbers with two decimals in the Table of Species and Diameter Group Percents for Non Sampled Strata, and also calculated and punched into IBM Card Decks No's. 14, 16, 34, and 36 for all species and their diameter groups of all volume strata.

17.2(34) Plot Number. See Location/Plot Number, section 17.2(20)

17.2(35) Plot Poletimber Volume Blow Up Factor. Punched as a single-digit number (with no decimals) into the Location Volume Blow Up Master Card. The plot poletimber volume blow up factor will be applied to the merchantable PT volume on 1/40 acre to blow it up to the ST level on 1/5 acre, for use in the plot volume summary for growth. The plot poletimber volume blow up factor is 8.

17.2(36) Plot Sawtimber Volume Blow Up Factor. Punched as a single-digit number (with no decimals) into the Location Volume Blow Up Master Card. The plot sawtimber volume blow up factor will be applied to the merchantable ST and/or PT+ST volume on 1/5 acre to blow it up to the 1 acre level, for use in the plot volume summary for growth. The plot sawtimber volume blow up factor is 5.

17.2(37) Sample Tree. Punched as a single-digit code for each tree on the plot, as follows:

0 Any live tree (S/S, PT, or ST) that is not a quality sample tree; one card No. 21 punched for these trees.
1 Merchantable ST Spruce or Hemlock tree that is a quality sample tree; on an odd numbered field location; one card No. 21 punched with the data for logs 1 to 5, if the tree has 5 or less quality logs; two cards No. 21 punched if the tree has 6 or more quality logs, this the first card for these trees contains the data for logs 1 to 5.
2 Merchantable ST Spruce or Hemlock tree that is a quality sample tree with 6 or more quality logs; this the second card for these trees contains the data for logs 6 to 10.
7 Mortality PT or ST tree. One card No. 21 is punched for these trees.
8 Salvable dead PT or ST tree. One card No. 21 is punched for these trees.
9 No live merchantable trees on the plot.

17.2(38) Site Class Old Growth Stands. The site class for old growth stands, SSC 4 and 5 will be the average number of 16 foot logs to a 6" top d.i.b. of the dominant and codominant trees. The old growth site class will be recorded as a two-digit code in the Plot Record for each plot, like 05, 07, 10, etc.

Young Growth Stands

The site index for young-growth stands, SSC 1, 2, 3, and 5, will be determined from height-age relationships and expressed as site class using the first two digits of the three-digit site index. The site class for young growth stands will be recorded as a two-digit code in the Plot Record for each plot, and in the Yield Tables. The site class codes for young growth stands are:

07	Site index 70
09	Site index 90
11	Site index 110
13	Site index 130
15	Site index 150

If site is not classified for any reason for old growth or young growth stands, use the code 99.

17.2(39) Species Group (SG). Gang punched as a single-digit code into each tree card, and into other summary and master cards as required. Recorded in the Tree Volume Tables, the Table of Average Merchantability Factors, the Table of Breakage Factors, the Table of Scribner to International Ratios, the Table of Average Volumes per Acre, the Table of Species and Diameter Percents for Non Sampled Strata, the Table of Sawlog Cubic Volume Factors, and the Table of 10 year Average Growth per Acre.

The species group codes are:

1 Softwoods
3 Hardwoods
5 Softwoods and Hardwoods combined
9 No live merchantable trees on the plot.

17.2(40) Species (SP). Recorded as a two-digit code in the Plot Record for each tree on the plot. Also recorded in the Tree Volume Tables, the Table of Average Merchantability Factors, the Table of Breakage Factors, the Table of Scribner to International Ratios, the Table of Species and Diameter Group Percents for Non Sampled Strata, and the Table of Sawlog Cubic Volume Factors.

If local combinations of two or more of the coded species or genera are desired, the code number of the most important species or genera in the sub group can be used.

The species codes by species group and sub group are:

1 - Softwoods

00 - Douglas-fir--Redwood (00 to 09)

01 Douglas-fir (Pseudotsuga menziesii)
02 Bigcone Douglas-fir (P. macrocarpa)
03
04
05 Redwood (Sequoia sempervirens)
06 Giant Sequoia (S. gigantea)
07
08
09

Pine (10 to 29)

10 Major Pines (10 to 19)
11 Ponderosa pine (Pinus ponderosa)
11 Arizona pine (P. ponderosa var. arizonica)
12 Jeffrey pine (P. jeffreyi)
13 Sugar pine (P. lambertiana)
14 Western white pine (P. monticola)
15 Lodgepole pine (P. contorta)
16
17
18
19

20 Minor Pines (20 to 29)

21 Coulter pine (Pinus coulteri)
22 Monterey pine (P. radiata)
23 Digger pine (P. sabiniana)
24 Knobcone pine (P. attenuata)

25 Bishop pine (P. muricata)
25 Torrey pine (P. torreyana)
25 Washoe pine (P. washoensis)

26 Apache pine (P. engelmannii)
26 Bristlecone pine (P. aristata)
26 Chihuahua pine (P. leiophylla var. chihuahua)
26 Foxtail pine (P. [illegible] balfouriana)
26 Limber pine (P. flexilis)
26 Whitebark pine (P. albicaulis)

27 Pinyon (P. edulis)
27 Mexican pinyon (P. cembroides)
27 Parry pinyon (P. quadrifolia)
27 Singleleaf pinyon (P. monophylla)

28
29

30 True Firs (30-39)

31 White fir (Abies concolor)
32 California red fir (A. magnifica)
32 Shasta red fir (A. magnifica var. shastensis)
33 Grand fir (A. grandis)
34 Pacific silver fir (A. amabilis)
35 Noble fir (A. procera)
36 Subalpine fir (A. lasiocarpa)

36 Corkbark fir (A. lasiocarpa var. arizonica)
37 Bristlecone fir (A. bracteata)
38
39

40 Spruce--Hemlock (40-49)
41 Englemann spruce (Picea engelmannii)
42 Sitka spruce (P. sitchensis)
43 Black spruce (P. mariana)
44 White spruce (P. glauca)
44 Porsild spruce (P. glauca var. porsildii)
45 Blue spruce (P. pungens)
46 Brewer spruce (P. breweriana)
47 Mountain hemlock (Tsuga mertensiana)
48 Western hemlock (T. heterophylla)
49

50 Cedar--Larch (50-59)
51 Incense-cedar (Libocedrus decurrens)
52 Alaska cedar (Chamaecyparis nootkatensis)
53 Port-Orford cedar (C. lawsoniana)
54 Western redcedar (Thuja plicata)

55 Western larch (Larix occidentalis)
56 Subalpine larch (L. lyallii)
57 Tamarack (L. laricina)
58
59

60 Other Softwoods (60-69)
61 California torreya (Torreya californica)
62 Pacific yew (Taxus brevifolia)

63 Alligator juniper (Juniperus deppeana)
63 California juniper (J. californica)
63 Common juniper (J. communis)
63 Eastern redcedar (J. virginiana)
63 One-seed juniper (J. monosperma)
63 Pinchot juniper (J. pinchotii)
63 Rocky Mountain juniper (J. scopulorum)
63 Utah juniper (J. osteosperma)
63 Western juniper (J. occidentalis)

64 Arizona cypress (Cupressus arizonica)
64 Gowan cypress (C. goveniana)
64 Mac Nab cypress (C. macnabiana)
64 Modoc cypress (C. bakeri)
64 Monterey cypress (C. macrocarpa)

64 Tecate cypress (C. guadalupensis)
65
66
67
68
69

3 - Hardwoods

70 Soft textured hardwoods (70-79)
71 Alder
All Alnus spp.
72 Ash
All Fraxinus spp
73 Aspen
Quaking aspen (Populus tremuloides)
74 Birch
All Betula spp.
75 Cottonwood
All Populus spp. except P. tremuloides
76 Maple
All Acer spp.
77 Willow
All Salix spp.
78
79

Oaks (80-89)
81 California black oak (Quercus kelloggii)
82 California live oak (Q. agrifolia)
83 California white oak (Q. lobata)
84 Canyon live oak (Q. chrysolepis)
85 Interior live oak (Q. wislizenii)
86 Oregon white oak (Q. garryana)
87 Tanoak (Lithocarpus densiflora)
88 Other oaks
89

90 Hard textured hardwoods (90-98)
91 California laurel (Umbellularia californica)
92 Cascara buckthorn (Rhamnus purshiana)
93 Golden chinquapin (Castanopsis chrysophylla)
94 Madrone - all Arbutus spp.
95 Dogwood - all Cornus spp.
96 Sycamore - all Platinus spp.
97
98

99 None or unknown1/

1/ Used for no live merchantable trees (5.0" DBH and over) on the plot.

17.2(41) Stand Age (SA). Recorded as a two-digit code in each Plot Record, and in the Yield Tables. A specific stand age will be assigned to each plot that is located in an evenaged young growth PT or ST stand. Stand age will be recorded for these stands to the nearest 10 years, like 03 for 30, 05 for 50, 10 for 100, 15 for 150, etc. The code 77 will be recorded for unevenaged young growth PT or ST stands; and the code 88 will be recorded for all old growth ST stands. If stand age cannot be determined, record the code 99.

The stand age codes are:

Evenaged young growth PT or ST stands: Record actual age to nearest 10 years, like 03, 05, 10, 13, etc.

Unevenaged young growth PT or ST stands: Record code 77.
Old growth stands: Record code 88.
Stand age not determined: Record code 99.

17.2(42) Stand Height (SH). Recorded as a three-digit code in each Plot Record. A specific stand height will be assigned to each plot that is located in an evenaged young growth PT or ST stand. Stand height will be recorded for these stands to the nearest 1 foot, like 058, 117, etc. The code 777 will be recorded for unevenaged young growth PT or ST stands; and the code 888 will be recorded for all old growth ST stands. If stand height cannot be determined, record code 999.

The stand height codes are:

Evenaged young growth PT or ST stands: Record actual height to nearest 1 foot.

Unevenaged young growth stands: Record code 777.
Old growth stands: Record code 888.
Stand height not determined: Record code 999.

17.2(43) Stand Size Class (SSC). Recorded as a single-digit code in the Record of Area for each stratum, the Area Field Check Record for each photo plot, the Plot Record for each plot, and in the Table of Average Volumes per acre, the Table of Species and Diameter Group Percents for Non Sampled Strata, and the Table of 10 Year Average Growth per Acre.

The stand size class codes are:

Commercial and Productive Noncommercial Forest Areas

1 Seedling/Sapling
2 Poletimber
3 Young growth sawtimber
4 Old growth sawtimber
5 Nonstocked and other areas

Unproductive Noncommercial Forest Areas

6 All areas

Nonforest Areas

8 All areas

Unclassified Areas

9 All areas

17.2(44) State. Recorded as a two-digit code in each Record of Area, Area Field Check Record, Table of Area Control Data, Plot Record, Table of Volume Control Data, Tree Volume Tables, Table of Average Merchantability Factors, Table of Breakage Factors, Table of Scribner to International Ratios, Table of Average Volumes per acre, Table of Species and Diameter Group Percents for Non Sampled Strata, Table of Sawlog Cubic Volume Factors, Yield Table, Table of 10 Year Average Growth per Acre, and Table of Tree Gross Volume Percents by 16' Log Height and 16' Log Position.

The state code is:

02 Alaska

17.2(45) Stocking Class (Density)(SC). Recorded as a two-digit code in the Record of Area for each stratum, in the Area Field Check Record for each photo plot, and in the Plot Record for each plot. The first digit signifies the stocking class of all trees in the stand, and the second digit signifies the stocking class of the ST trees (11.0" DBH and over) in the stand. However, the code 0 will be used for the stocking class of ST trees in old growth sawtimber stands, SSC4; and the code 5 will be used for the stocking class of ST trees in seedling/sapling, poletimber and nonstocked stands, SSC 1, 2, and 5. In young growth sawtimber stands a specific code will be assigned for ST trees as indicated below.

The stocking class codes are:

Commercial and Productive Noncommercial Forest Areas

Codes for stocking of all-size trees of all stands and stocking of ST size trees of young growth sawtimber stands:

1 Poorly stocked stands, 10 to 39%
2 Medium stocked stands, 40 to 69%
3 Well stocked stands, 70 to 100%
5 Nonstocked 0 to 10%

Codes for stocking of ST size trees of stands other than young growth sawtimber stands:

0 ST tree stocking for old growth sawtimber stands
5 ST tree stocking for seedling/sapling, poletimber, and non-stocked stands.

Unproductive Noncommercial Forest Areas

Codes for stocking of all-size and ST size trees.

6 All areas

Non Forest Areas: Codes for stocking of all-size and ST size trees

8 All areas

Unclassified Areas: Codes for stocking of all-size and ST size trees.

9 All areas

Some examples of coding stocking are:

(1) Young growth ST stand, well stocked with all trees, medium stocked with ST trees - code is 32.
(2) Old growth ST stands, poorly stocked with all trees - code is 10.
(3) Nonstocked area - code is 55.
(4) PT stand, medium stocked - code is 25.
(5) S/S stand, well stocked - code is 35.
(6) Noncommercial area - code is 66.
(7) Nonforest area - code is 88.
(8) Unclassified area - code is 99.

17.2(46) Subregion (SR). Recorded as a single-digit code in each Record of Area, Area Field Check Record, Table of Area Control Data, Plot Record, Table of Volume Control Data, Tree Volume Table, Table of Breakage Factors, Table of Average Volumes per Acre, Table of Species and Diameter Group Percents for Non Sampled Strata, and Table of Average Growth per Acre. The subregion codes are:

1 South East Alaska
2 Chugach
3 Interior Alaska

17.2(47) Survey Unit (SU). Recorded as a two-digit code in the Record of Area, Area Field Check Record, Table of Area Control Data, Plot Record, Table of Volume Control Data, Table of Breakage Factors, Table of Average Volumes per Acre, and Table of Species and Diameter Group Percents for Non Sampled Volume Strata.

The survey unit codes by subregion are:

1 - South East Alaska Subregion

11 Juneau
12 Ketchikan
13 Petersburg
14 Sitka
15 Yakutat

2 - Chugach Subregion

21 Kenai
22 Princh William Sound

3 - Interior Alaska Subregion

30 Susitna - Matanuska
31 Kenai - W. Cook Inlet
32 Tenana - Fairbanks
33 Upper Tenana
34 Copper River
35 Upper Yukon
36 Lower Yukon
37 Kuskokwin
38 Bristol Bay
39 Katzebue - Norton Sounds

17.2(48) Tree Number. Recorded as a two-digit number in the Plot Record for each tree on the plot, like 01, 13, 27, etc. The tree numbers will begin with 01 on each plot. Record the code 99 when there are no live merchantable trees on the plot.

17.2(49) Type, Local Forest (T). Recorded as a two-digit code in the Record of Area for each stratum; in the Area Field Check Record for each photo plot; in the Plot Record for each plot; and in each Table of Average Volumes per Acre, Table of Species and Diameter Group Percents for Non Sampled Strata, and Table of 10 Year Average Growth per Acre.

The local type codes and their corresponding major type codes are:

Symbol	Code	Local Type	Corresponding Major Type Codes
Commercial and Productive Noncommercial Forest Land			
		Softwood Types	
HS	40	Western Hemlock - Sitka Spruce	02
S	42	Sitka Spruce	02
Ŝ	43	Black Spruce1/	12
S	44	White Spruce1/	12
H	48	Hemlock	02
C	50	Cedar	02
		Hardwood Types	
D	70	Hardwood	10
A	73	Aspen1/	20
B	74	Birch1/	20
P	75	Cottonwood1/	10
Unproductive Noncommercial Forest Land			
ŝ	63	Black Spruce1/	66
Sc	66	Scrub	66
Z	66	Subalpine1/	66
Non Forest Land			
U	81	Land Removed from Forest Land	88
OM	82	Grass/Brush/Muskeg	88
OB	83	Barren	88
Vm	84	Sedge/Tussock1/	88

1/ Additional local types for Interior Alaska.

Symbol	Code	Local Type	Corresponding Major Type Codes
St	85	Tall Shrub1/	88
Ss	86	Dwarf Shrub1/	88
W	87	Water areas between Survey minimum area and 40 acres (Census minimum area)	88
O	88	Other Nonforest1/	88
Unclassified Land			
-	99	All areas	99

17.2(50) Type, Major (MT). The Forest Survey major type will be gang punched as a two-digit code into the area and volume cards as required. The major types, their codes, and the corresponding local type codes are:

Major Type		Corresponding Local Type Codes
Commercial and Productive Noncommercial Forest Land		
Western Types		
01	Douglas-fir	None
02	Hemlock-Sitka Spruce	40, 42, 48, 50
03	Redwood	None
04	Ponderosa pine	None
05	Western white pine	None
06	Lodgepole pine	None
07	Larch	None
08	Fir-spruce	None
09	Pinyon pine-juniper	None
10	Hardwoods	70, 75
Eastern Types		
11	White-red-jack pine	None
12	Spruce-fir	43, 44
13	Longleaf-slash pine	None
14	Loblolly-shortleaf pine	None
15	Oak-pine	None
16	Oak-hickory	None
17	Oak-gum-cypress	None
18	Elm-ash-cottonwood	None

1/ Additional local types for Interior Alaska

Major Type	Corresponding Local Type Codes
19 Maple-beech-birch	None
20 Aspen-birch	73, 74
Unproductive Noncommercial Forest Land	
66 All areas	63, 66
Nonforest Land	
88 All areas	81, 82, 83, 84, 85, 86, 87, 88
Unclassified Land	
99 All areas	99

17.2(51) Volume, Average per Acre-Net. The cubic foot, International 1/4" b.f., or Scribner b.f. average net volumes per acre will be recorded in the Table of Average Volumes per Acre as five-digit numbers with no decimals.

17.2(52) Volume Conversion Factor, Average per Acre. The factors for converting the LT/SSC stratum total woods gross volume on a tree basis to average woods gross volume per acre will be calculated as eight-digit numbers with five decimals in the Volume Conversion Factor Master Deck No. 71. These factors will be calculated by multiplying the total numbers of 1/5-acre plots on which volume may be sampled by the acreage on which a 10" DBH group is sampled on an individual plot; and calculating the reciprocal of the result.

Volume samples are taken on subplots that vary in size according to the 10" DBH group of the tree. The subplot sizes by 10" DBH group are:

10" DBH group	Range of Diameters	Plot Size	Plot Multiplier
0	1.0" to 4.9" DBH	1/200	0.005
1	5.0" to 10.9" DBH	1/40	0.025
2, 3, 4, 5	11.0" and over	1/5	0.200

17.2(53) Volume, Cubic Foot-Tree. The tree cubic foot gross volumes will be recorded in the Tree Volume Tables and will be punched into the Tree Volume cards as five-digit numbers with one decimal.

17.2(54) Volume, Sawlog Cubic Factors. Recorded as two-digit numbers with two decimals in the Table of Sawlog Cubic Volume Factors.

17.2(55) Volume, Scribner Decimal C - Tree. The tree Scribner Dec. C gross volumes will be recorded in the Tree Volume Tables and will be punched into the Tree Volume Cards as four-digit numbers, to the nearest 10 board feet.

17.2(56) Volume, Scribner to International 1/4" Ratio. Recorded as a three-digit number with two decimals for each species/10" DBH group in the Table of Scribner to International Ratios. The Scribner to International ratios will be used to convert Scribner b.f. volume to International 1/4-inch b.f. volume.

17.2(57) Volume Increment per Acre Cubic Foot. The cubic foot mean annual increment per acre will be recorded as a three-digit number with no decimals, by 10 year age class and site class, in the Yield Tables.

17.2(58) Volume Increment per Acre, International 1/4-inch Board Foot. The Int. 1/4" b.f. mean annual increment per acre will be recorded as a four-digit number with no decimals, by 10 year age class and site class, in the Yield Tables.

17.2(59) Volume Stratum (VS). The volume strata are the combinations of land type/local forest type1/ /stand size class for which average volumes per acre will be compiled for the Survey units (subregions for MC7). The two-digit volume stratum codes will be assigned when the average volumes per acre are calculated and recorded in the Table of Average Volumes per Acre. These codes will begin with 01 within each Survey unit (subregion for MC7).

The volume stratum codes will be gang punched into the Area, volume, growth, and quality detail, summary, and master decks as required. Volume stratum also will be recorded in the Table of Average Volumes per acre, the Table of Species and Diameter Group Percent for Non Sampled Strata, and the Table of 10 Year Average Growth per Acre.

The volume stratum codes will be added for each survey unit (subregion for MC7) as volume compilation progresses, as follows:

1/ Included as a control item if required.

VOLUME STRATUM CODES
For 2/ Merchantability Class.

State xx Survey Unit xx 1/
Subregion x Date

Volume Stratum Code	Land Type	Local Type1/	Stand Size Class
xx	x	xx	x

1/ Included as a control item if required.
2/ Enter Live and Salvable Dead; or Mortality.

17.3 Symbols. The symbol or abbreviation for the main items of data, and the sections in which the codes for these items are given, are listed below.

Symbol	Main Item of Data	Section for Codes
BF	Breakage factor	17.2(6)
BL	Block	17.2(5)
CD	Cause of death	17.2(7)
DBH	Diameter, breast high	17.2(8),(9), &(10)
DBT	Double bark thickness	17.2(4)
KV	Kind of volume	17.2(18)
LMF	Log Merchantability factor	17.2(26)
LT	Land type	17.2(19)
MC	Merchantability class	17.2(29)
MF	Merchantability factor	17.2(30)
MT	Major type	17.2(50)
MWC	Major wood class	17.2(28)
NFA	National Forest Administration	17.2(31)
SA	Stand Age	17.2(41)
SC	Stocking class	17.2(45)
SG	Species group	17.2(42)
SH	Stand height	17.2(42)
SP	Species	17.2(40)
SR	Subregion	17.2(46)
SSC	Stand size class PT = poletimber, S/S = seedling/sapling, ST = sawtimber, OG = old growth, YG = young growth	17.2(43)
SU	Survey Unit	17.2(47)
T	Local forest type	17.2(49)
VS	Volume stratum	17.2(59)

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